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Finger Lakes National Forest

Final Environmental Impact Statement Appendices A-G

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APPENDIX A PUBLIC INVOLVEMENT

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Introduction

The Finger Lakes National Forest (FLNF) is the only National Forest in the State of New York. It is one of the smallest national forests and contains more than 16,000 acres on a ridge between Seneca and Cayuga Lakes, the largest of New York's Finger Lakes. More than two million people live within a 100-mile radius of the Forest. The local community has a long history of involvement with the management of the Forest and generally is supportive of its management. The Forest Service utilizes multiple-use principles to provide various recreation activities, create and/or maintain essential wildlife habitat, graze cattle, provide clean water, and supply trees for wood products. Key issues in management planning include biodiversity and ecosystem management, recreation management and timber management.

The Forest Service started the process to revise the FLNF 1987 Forest Plan in 1996. One of the goals of this process was to emphasize public involvement and community partnerships. Forest Plan revision is a process that relies heavily on the collaboration of many stakeholders and the resolution of issues. Through extensive public involvement, the Forest Service created a collaborative relationship with various stakeholders so that contentious issues could be discussed and addressed through the revision of the Forest Plan.

The Finger Lakes National Forest staff believes that a Forest Plan should be responsive to people's needs, easily understood, and usable by both natural resource managers and the public. The success of the Forest Plan revision process depends on collaboration with various stakeholders and the resolution of contentious issues to create a Forest Plan that is realistic and adaptable to change.

Some of the expected outcomes of public involvement during Forest Plan revision include:

- A collective vision for the role of the Finger Lakes National Forest
- Strong partnerships and collaborative relationships between the Forest Service and the public which continue into the implementation of the 2006 Forest Plan
- Improved techniques for the stakeholders to work together and to resolve conflicts when they arise
- Improved implementation of the 2006 Forest Plan
- Improved understanding of the difference between Forest Plan revision and Forest Plan implementation

The National Forest Management Act (NFMA) requires public participation during Forest Plan revision. During the development of the 1987 Forest Plan, public participation consisted primarily of soliciting the public's input on proposed management and incorporating the Forest Service's solutions in the final Forest Plan. As a result, some people felt alienated from the process and unhappy with the decisions made by the Forest Service. During the revision of the present Forest Plan, the Forest Service endeavored to engage the public as partners in management from the beginning of the process rather than asking for reactions to proposals. To engage those interested in forest planning, the Forest Service created a variety of participation formats including:

- One-on-one interactions with interested people and local governments
- Public meetings to work on issues development
- Field trips
- Educational forums

A mailing list of more than 600 people was used to inform interested publics, governmental organizations, non-governmental organizations, and Native American Tribes of Forest Plan revision information, opportunities to comment, and opportunities to attend meetings. Furthermore, Forest Plan revision information was made widely available on the Finger Lakes National Forest web site. The web site included background information on Forest Plan revision, assessments used in revising the Forest Plan, information presented at public meetings, comments received at each public meeting, and information on how to contact the Finger Lakes National Forest for more information or to provide input into the process.

Public Involvement 1996-1998

Information contained in this section was adapted from *Public Involvement in Forest Management Planning: A View from the Northeast*, published in Understanding Community-Based Forest Ecosystem Management and the Journal of Sustainable Forestry (Twarkins et al. 2001).

The Forest Plan revision process was initiated in 1996, with the USDA Forest Service Joint Core Planning Team (Forest Service staff representing the Finger Lakes National Forest, the Green Mountain National Forest, and the White Mountain National Forest) outlinining basic principles and procedures for revising their Forest Plans. One primary tenet of the planning process was to focus on partnerships. It was decided that the best way to revise the Forest Plan was to:

- Involve the public from the very beginning
- Share information
- Focus public involvement on dialogue, learning, and joint problem-solving

A focus on partnership versus traditional public involvement was new for forest planning in the Northeast. The following five-phase process to revise the Forest Plan was developed:

1. Public outreach. The Forest Service develops a list of issues based on current plans and thorough discussions and public meetings with Forest Service employees, the public, and groups currently engaged in forest management.
2. Public planning group. The Forest Service hosts public planning group meetings, disseminates information on planning regulations, past management plans, and other relevant information. The public planning group reviews performance of current plans and raises further issues.
3. Collect information to evaluate revision needs. The Forest Service and public planning group form technical working groups to collect and analyze information on specific issues raised by the public planning group.
4. Need for change. The technical working groups work with the public planning group to document areas of possible change to the existing Forest Plan.

5. Formal National Environmental Policy Act (NEPA) process to revise the Forest Plan. The Forest Service starts the formal NEPA process to prepare an Environmental Impact Statement for the revision of the Forest Plan. The public would be involved through the entire process providing comments to proposals, ideas for management, solutions to problems, and concerns to be addressed.

The Forest Service held two public outreach sessions that generated more than 600 comments. The public planning group worked to sort and refine these issues during a series of meetings. Issues were also clarified during a field study tour.

The Forest Service and the public planning group sorted issues into the following categories:

- Issues to be addressed through the revision of the Forest Plan
- Issues best addressed by amending the current Forest Plan
- Issues outside the jurisdiction of the Forest Service
- Issues already covered by the Forest Plan which could be addressed immediately by changing Forest priorities

In 1999, the Congress halted all Forest Plan revisions in preparation for a revised national planning rule. At that point, all activities related to the public planning groups on the Finger Lakes National Forest stopped. Several citizen groups formed to work on issues raised during this process. These groups continued to meet and work with the Forest Service.

Public Involvement 2002-2004

Federal Partnership Program Grant

The Finger Lakes National Forest staff resumed Forest Plan revision in 2001. The Forest Service applied for and received a grant from the US Institute for Environmental Conflict Resolution (US Institute) to develop and implement a public involvement process for Forest Plan revision. The US Institute contracted Interface, part of the Community Dispute Resolution Center based in Ithaca, New York, to work directly with the Forest Service and the public. The goal was to help both the public and Forest Service work together and collaboratively resolve contentious issues and develop Forest Plan alternatives to address these issues. Through this grant, Interface was charged with:

1. Preparing a Situation Assessment
2. Designing and evaluating a public involvement process to revise the Forest Plan
3. Facilitating meetings
4. Training the Forest Service and stakeholders in environmental conflict resolution techniques in order to collaboratively revise the Forest Plan and to resolve contentious future issues
5. Initiating public planning meetings
6. Focusing the issues for use in the Notice of Intent to Revise the Forest Plan using information from the Conflict Assessment
7. Creating a collaborative atmosphere with the public in order to explore issues and start to develop alternatives to the Forest Plan

The Finger Lakes National Forest staff worked with the US Institute and Interface throughout the entire Forest Plan Revision process.

Situation Assessment November 2002

The Interface team worked with FLNF staff to identify a comprehensive list of stakeholders who were interested in or affected by the management of the FLNF. The Interface team and FLNF staff interviewed more than 40 of these stakeholders, representing a wide range of perspectives, as the basis for the Situation Assessment (Lauber et al. 2002).

Key findings that emerged from the interviews included:

- Perspectives about the Forest Service were mixed. Many people believed the FLNF staff – particularly the current District Ranger – to be friendly, accommodating, knowledgeable, accessible, and honest. Many others, however, view the Forest Service with distrust and suspicion.
- People are generally quite knowledgeable about the issues that concern them, but much less knowledgeable about the interests and concerns of other stakeholders.
- None of the interviewees appeared to understand the plan revision process well.
- Even the optimists believe any public involvement process will be difficult and frustrating but think that if stakeholders stay involved, a better plan will result.

Based on the Interface team's analysis of the interview results, a number of challenges were identified that the Forest Service will have to navigate to have a successful public involvement process:

- The relationship between the community and the Forest Service will be of paramount importance.
- The Forest Service and the community surrounding the FLNF define important management concerns differently – in ways that only partially overlap.
- Although some people interviewed were fully supportive of multiple use management, including resource extraction, a sizable number had concerns and desires not completely compatible with the Forest Service's multiple-use mandate. They would like the Forest to be protected from the disturbance caused by resource extraction to protect other benefits.
- A number of people interviewed claimed that much of the disagreement about how to manage the FLNF was caused by a lack of understanding of science, but value-based conflicts are also very important. Delineating the role that science can and cannot play in management decisions will help to improve any public involvement process.
- There are a number of terms that have different meanings for people and therefore cause problems of understanding.
- Perspectives on ownership of the Forest differ. The Forest Service views the Forest as the property of the entire nation. Many members of the local community see the Forest as a unique part of the local environment and think the Forest belongs to them.
- The most controversial management issues in the FLNF have been exacerbated by the tendency for people with various perspectives on these issues to view those who disagree with them in extreme and simplistic ways.
- Currently, a lack of trust exists between members of the community and the Forest Service, and between members of the community with opposing interests.
- Many FLNF stakeholders either do or can make use of unilateral strategies to help obtain their objectives. This will create obstacles to developing the kind of working relationships needed to address the spectrum of issues.

While the challenges that the public involvement process presents are significant, there is also reason to expect that these challenges can be met. The Forest Service can increase the likelihood of navigating these challenges by:

- Making Forest Service operations transparent
- Building a common body of knowledge among stakeholders interested in the FLNF
- Designing a public involvement process that is fair and perceived as fair
- Producing accessible reports and information

The report proposes a public involvement process that is based on the information learned from this assessment. The key elements of the recommended approach are:

- Initial workshop(s) to lay the groundwork for the public involvement process.
- Visioning session(s) to articulate collaboratively developed goals and desired future conditions for the Forest.
- A series of large meetings to discuss issues identified in the Notice of Intent to revise the Forest Plan and the inventory and assessment process.
- Articulation of standards and guidelines for the whole Forest and particular management areas by the Forest Service.
- Heterogeneous groups of stakeholders develop maps specifying the amount and location of different management areas. Each group delineates the pros and cons of their map.
- Maps gathered and discussed with the public, culminating in the Forest Service developing several options based on the maps and public input on them

All of the public involvement detailed below was conducted in conjunction with Interface and consistent with the Situation Assessment.

Notice of Intent to Revise the FLNF Plan

Public planning meetings were resumed with two meetings – February 11, 2002 at the Lodi Fire Hall and February 13, 2002 at the Watkins Glen High School. The meetings were designed to:

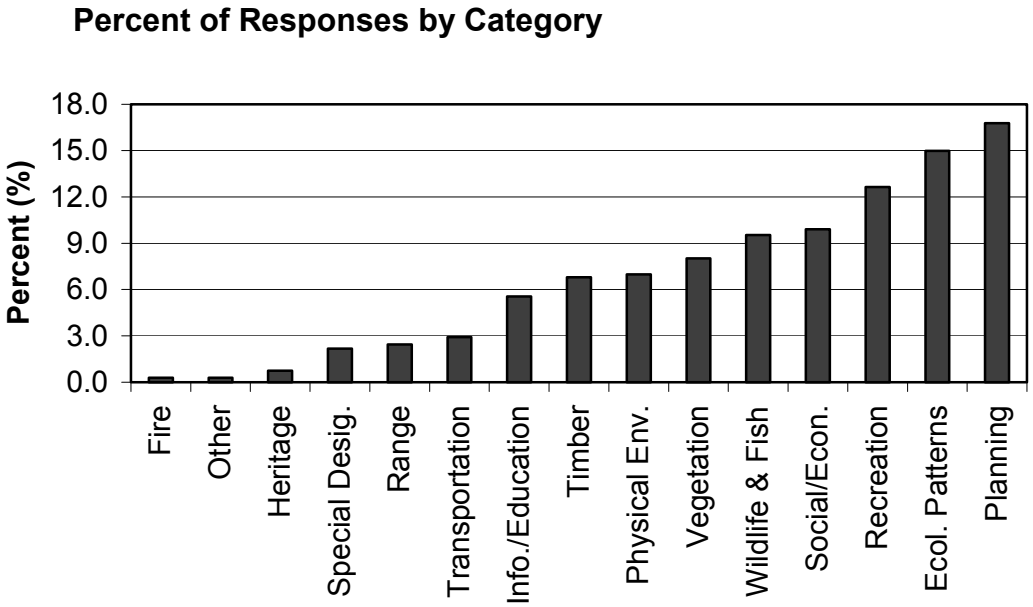
- Provide an opportunity for community discussion on the planning process
- Provide an overview of the 1996 planning process and what has happened since then
- Outline Forest Service planning requirements and other laws that affect Plan revision
- Validate issues identified in the 1996 planning process and identify any issues that have emerged since then
- Discuss the FLNF proposed public planning process and timeline

Information from these first two meetings was used in the Notice of Intent to prepare an Environmental Impact Statement (NOI) for the revision of the Finger Lakes National Forest Land and Resource Management Plan (Forest Plan). The NOI was published in the Federal Register May 2, 2002. Three major issues expected to vary by alternative were identified along with issues that would be addressed through the revised Forest Plan goals, objectives, standards, and/or guidelines. The three major issues were Biodiversity and Ecosystem Management, Recreation Management, and Timber Management. Specific information on these issues can be found in Chapter 1 of this Final Environmental Impact Statement.

The NOI was followed by a formal comment period. The Forest Service received 28 responses on the NOI, of which 27 were unique letters and one was a telephone call. These responses were received from numerous organizations and from people in a variety of geographic areas (Table A-1). Each public response was reviewed by at least two members of the Forest Planning Team. To organize and analyze each public response received, analysis of the comments was conducted. Review of the public comments confirmed that the Plan revision process will be covering the concerns of the public. The majority of the comments received dealt with public interest in forest planning (16.8%), ecological patterns and processes (15.0%), and recreation (12.6%) (Figure A-1).

Table A-1: Organizations and State of Respondents to FLNF Notice of Intent			
	Number of Responses by State		
Organizations, Industries, Governments, and Groups that Responded*	**State**	**Number of Responses**	**Percent of Total Responses**
Acorn Design	New York	23	82.1
Citizens Campaign for the Environment	Massachusetts	1	3.6
Finger Lakes Forest Watch	New Jersey	1	3.6
National Park Service: Ice Age and North Country National Scenic Trail	Oregon	1	3.6
National Wild Turkey Federation	Wisconsin	1	3.6
Natural Resources Council	Unknown	1	3.6
Newell Farm			
New York Fish and Wildlife			
Pacific Rivers Council			
The Ithaca Journal			
The Wilderness Society			
*Note: Numerous comments were received from individuals with no designated affiliation.			

Figure A-1.



Local Planning Meetings

A public meeting was held on February 5, 2003 at the Hector Fire Hall. The meeting focused on trying to clarify the public involvement process during Plan revision and to get feedback on the collaboration workshop scheduled for March or April. The meeting consisted of an update on the process by the Forest Service, a review of public comments on the Notice of Intent to revise the Forest Plan, and small group discussions on the public involvement strategy and the collaboration workshop. The small group discussions were designed to help people understand each others' points of view.

Starting April 3, 2003, regular public meetings were held at 7:00 pm the first Thursday of each month at the Hector Fire Hall. Each meeting was opened by either the District Ranger or Forest Supervisor and was staffed with several Forest Service resource specialists and members of the planning team. The meeting on April 3 focused discussions on goals for the revised Forest Plan. The meeting consisted of four stations with the goals in the current Forest Plan listed on poster board. A Forest Service employee recorded suggested changes, comments, and additions. The public was encouraged to visit each station and discuss the Forest Plan goals with other stakeholders and with the Forest Service. Both the Forest Service and public agreed that this was one of the best meetings to date. The informal set-up encouraged dialogue among stakeholders as well as with the Forest Service.

A workshop was scheduled for April 26, 2003. The workshop was designed to teach the public and Forest Service collaborative skills as well as to discuss timber harvesting and vegetation management for the revised Forest Plan. Given the small turnout for this meeting, it was decided that the collaboration skills would be incorporated into the June and July monthly meetings that focused on the FLNF trail system. Timber harvesting and vegetation management was discussed along with ecosystem management.

The meeting on May 1, 2003 focused on land acquisition, land adjustment, developed recreation and undeveloped recreation. Trails were discussed in the June and July meetings. The meeting format included short presentations by the Forest Service followed by small group work.

The June 6, 2003 and July 7, 2003 meetings focused on conflict resolution skills and trails. These meetings were designed as a two-part conflict resolution workshop with practical application of the techniques to the issue of trails.

The June 6, 2003 meeting started with a brief Forest Service presentation on an introduction to Forest Plan revision and an overview of trails in the current Forest Plan. Interface then presented information on “listening for understanding” and “understanding what’s really important”. The presentation included a very entertaining skit that demonstrated the concepts. The public was then divided into four small groups and asked to practice reflective listening and discuss general comments about trails. The Forest Service staff members also practiced reflective listening skills with the group by reflecting public comments while they recorded comments on the flip charts. Specific trail information was handed out as pre-work for the July meeting.

The July 7, 2003 meeting started with a review of the June meeting, including a review of the conflict resolution skills. Then the Forest Service presented a summary of the comments received at the June meeting and a trail plan proposed by a public trails group. Small groups were formed and the public discussed the proposed trail plan in relation to the comments. People also discussed possible solutions to trail conflicts.

The August 7, 2003 meeting focused on vegetation, timber, and ecosystem management. This meeting followed the general pattern of a presentation by various Forest Service resource specialists followed by small group discussions. The public was asked to remember the skills learned in the previous two meetings. The small group discussions focused on what vegetative communities people wanted to see on the Forest, what management tools people wanted the Forest Service to use to maintain those communities, and if that is different from current management.

The September 4, 2003 meeting focused on biodiversity and ecosystem management. This meeting followed the general pattern of a presentation by various Forest Service resource specialists followed by small group discussions. This meeting was a little different from previous meetings due to the large amount of information that the Forest Service needed to present. The presentation lasted about one hour and was designed to be interactive with meeting participants. After the presentation, the group

stayed together to ask clarifying questions. Participants then broke into small groups to answer several questions posed to the group by the Forest Service.

The October 2, 2003 meeting focused on the roads within the FLNF. Originally the Forest Service did not plan to devote an entire public meeting to this issue; however, it seemed to be a growing issue to the local population and the local elected officials. Many of the people attending this meeting had not attended previous Plan revision meetings. The Forest Service started out the meeting with a detailed introduction to Forest Plan revision and then presented information about the road network in and around the National Forest. The public then broke into small groups to discuss and write specific concerns on the maps. There was a Forest Service employee at each table to help answer questions and to facilitate writing comments on the maps. In conjunction with this meeting, the town and county boards are working with the Forest Service to write several grants to help with road maintenance and planning.

The meeting on November 6, 2003 was the first in a series of two meetings devoted to management areas (MAs) and the development of draft alternatives for the revised Forest Plan. The meeting started with a Forest Service presentation focused on Forest Plan revision, a description of each MA on the FLNF, and suggestions for possible changes to the current Forest Plan. The presentation was followed by a time for clarifying questions and then the public broke into small groups to look at maps and provide comments. One of the main goals of the meeting was to present information about Management Areas so the public would be able to draw the MAs on maps at the December meeting. Handouts and maps were given out so people could think about how they would arrange the MAs at the December meeting.

The December 4, 2003 meeting was a continuation of the November 6, 2003 meeting and focused on mapping management areas (MAs) on the Finger Lakes National Forest. The meeting started with a short Forest Service presentation on Forest Plan revision, a review of the November meeting and MA descriptions, and highlights of changes made to MA descriptions based on public and internal comments and feedback. A short discussion and question-answer period followed to discuss changes made to the MAs. After the presentation, an example map was shown. People were then directed to different tables for the mapping exercise. Each table had a Forest Service employee recording comments on note pads and on the maps. People were asked to draw lines on a clear plastic map of the FLNF. Maps showing different resources were placed under the clear plastic to help people draw lines and answer questions. People were given the following directions:

- Discuss the current management areas
- Develop a group strategy for completing the mapping exercise
- Focus on changing current management areas and newly acquired land
- Resolve issues and concerns with management area mapping
- Lines do not have to be exact
- This is a group activity
- Document reasons for agreement and disagreement on the map and flip chart
- Have fun

The meeting on March 4, 2004 was to show the public the Forest Service's first attempt at draft alternatives. The Forest Service used the public maps created in December, along with resource maps, public input from the other Plan revision meetings, and resource assessments to develop rough draft alternatives. The meeting started with a presentation of Forest Plan revision, where the FLNF is in the process, how alternatives were developed, and an explanation of the next steps in the process.

Three stations with the alternatives were set up to display the three FLNF alternatives. One Forest Service employee took public comments on a flip chart and another answered questions and facilitated discussion at each station. The public was asked the following questions:

- What is positive about each alternative?
- What could be changed to make each alternative better?
- What is missing in each alternative?
- How well does each alternative address Plan revision issues?

The final Forest Plan revision meeting before the release of the draft Forest Plan and Draft Environmental Impact Statement was held on June 24, 2004. This meeting focused on the Trails Analysis Process. The meeting started with a Forest Service presentation on the Trails Analysis Process and how it was conducted. Recommendations for future trail planning were also presented. The meeting then turned into an open house where the public was given the opportunity to see and discuss more than 17 different resource maps. Comments were recorded on flipcharts and the maps.

Other Public Involvement

The Forest Service has maintained other avenues for public involvement besides public meetings. This is done in an effort to involve as many people as possible in the revision of the Forest Plan. One key aspect of the public's involvement included a Plan revision web site (http://www.fs.fed.us/r9/gmfl/nepa_planning/plan_revision.htm). The information contained on the web site includes:

1. Frequently Asked Questions about Forest Plan revision
2. Biographical information on the Planning Team
3. The Finger Lakes 1987 Forest Plan
4. Links to other useful information
5. Plan revision documents and assessments
6. Information presented at each public meeting
7. Notes and public comments recorded at each public meeting

The Finger Lakes National Forest also utilized a mailing list of more than 600 people to send out meeting notices and updates on the Plan revision process. The mailing list included interested individuals, State, and federal governmental agencies, non-governmental organizations, and Native American Tribes. Two field trips were held to discuss timber harvesting and Plan revision. One field trip was held to discuss recreation and trail issues. An educational forum on timber harvesting was also held to present different viewpoints on the timber harvest issue. Several presentations were made to groups, individuals and university classes when requested.

Finally, the Forest Service encouraged people through public notices, newsletters, mailings, public meetings, and web site to provide comments in many different ways. People provided input on the Forest Plan revision process through phone calls, email, written letters, or personal contacts at the Hector office.

Consultation with Native American Tribes

The Forest Service contacted Ms. Kathleen Mitchell, the Tribal Historic Preservation Officer of the Seneca Nation of Indians, to discuss Forest Plan revision and other projects on the Finger Lakes National Forest. Aside from informal emails and phone conversations, a meeting was held on April 6, 2001 between Ms. Mitchell, Martha Twarkins, the Finger Lakes National Forest District Ranger, and Mike Dockry, the FLNF Assistant Planner. This meeting was held at the Seneca-Iroquois National Museum in Salamanca, New York. The Forest Service met with Clint Halftown and Bernadette Hill of the Cayuga Nation in the FLNF office in Hector, New York on September 27, 2001 to discuss Forest Plan revision and other projects. Correspondence with the Cayuga Nation also took place through phone calls, emails, and letters.

2005 to 2006: Post Notice of Availability of the Proposed Revised Forest Plan and Draft EIS

Open House

In June, 2005, after the release of the Proposed Revised Forest Plan and Draft EIS, an open house was held to present the Draft Environmental Impact Statement, and answer questions about the analysis and the preferred alternative. The meeting took place at the Watkins Glen High School in Watkins Glen, New York.

This open house was important for providing the information to the public and providing an opportunity for the public to ask questions about the Proposed Revised Plan so that they could provide informed comments.

Special Meetings with Groups

After the release of the Proposed Revised Forest Pan and Draft EIS, the Forest Service met with federal, tribal, and regional agencies and governments. The purpose of these meetings was to present the Draft Environmental Impact Statement and answer questions about the analysis and the preferred alternative.

- Seneca Nation (7/12/2005)
- Schuyler County Planning Environmental Management Council (7/12/2005)
- US Fish and Wildlife Service (05/03/2005)

The Cayuga Nation was kept informed of the Plan revision process and the public meeting schedule, and was provided with copies of the Proposed Revised Forest Pan and Draft EIS. They chose not to take advantage of a Forest Service offer to meet with Tribal representatives to discuss issues or concerns.

Literature Cited

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APPENDIX B ANALYSIS PROCESSES

Introduction.....B – 1
Timber Harvest Schedule Analysis.....B – 1
Economic Impact Analysis.....B – 9

Introduction

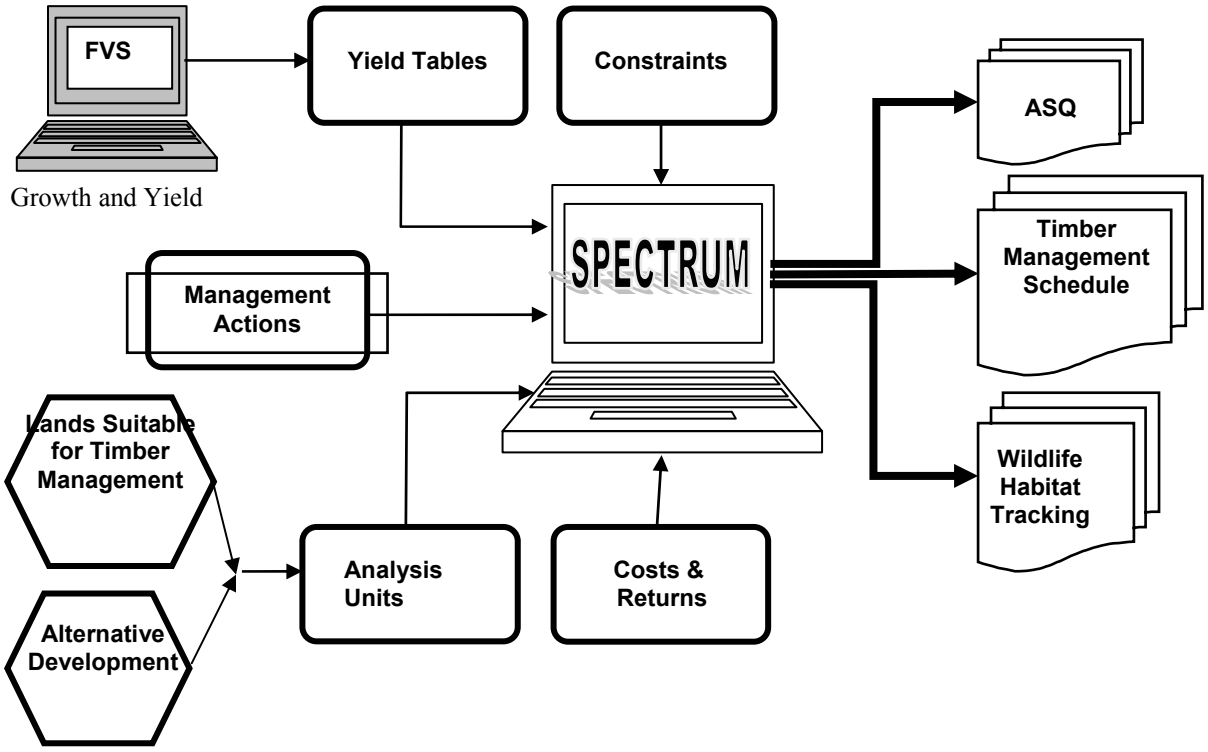
This appendix provides detail on the analysis processes that were used in the Forest Plan revision process to develop Forest Plan alternatives. These analysis processes produce estimates of what could be expected if the various alternatives were implemented, thereby facilitating comparison of alternatives. The analyses described in this appendix are the modeling of timber harvest schedules and the economic analysis process. The timber harvest schedule analysis was used to determine the allowable sale quantity in each alternative, and was also used in the vegetation affected environment and environmental consequences analysis found in Chapter 3 of this document. The other analysis process described in this appendix is the methodology used in the economic analysis, which was used in the social and economic affected environment and environmental consequences analysis in Chapter 3. The details of the analyses provided here include basic assumptions, modeling components and inputs, rules, methods, and constraints. Additional details and documents used in the analysis processes are contained in the planning records.

These analyses were performed to fulfill the requirements codified in the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 as amended by the National Forest Management Act (NFMA) of 1976. These Acts require that renewable resource programs be based on a comprehensive assessment of present and anticipated uses. The demand for and supply of renewable resources must be determined through an analysis of environmental and economic impacts. The regulations promulgating these acts are in Code of Federal Regulations, Title 36, Part 219 (36 CFR 219).

Timber Harvest Schedule Analysis

The timber harvest schedule analysis addresses the following issue: given a fixed area of land, what activities should be allowed to each land unit over the next 150 years to achieve desired future conditions while meeting all physical, operational, and regulatory constraints. An overview of the timber harvest schedule analysis process, the inputs involved, and the outputs achieved, is described in Figure B-1. The inputs used in this analysis were developed during the planning process. This data development included the identification of lands tentatively suitable for timber harvest (per 36 CFR 219.14), as well as the development of analysis units, timber yield tables, economic information, and management prescriptions, and the determination of suitable acreage within each alternative. The costs associated with various harvest activities, as well as the revenue from timber sales by product, were also developed for input to the model. The 1987 Plan and Proposed Revised Forest Plan standards and guidelines provided the framework for the constraints, the design of analysis units, and the development of possible timber management actions used in the model. The inputs in the analysis are described below.

Figure B-1. Timber Harvest Schedule Model - Process Overview



Yield Tables

The Washington Office Forest Management Service Center in Ft. Collins, Colorado supplied the software and expert advice to create the yield tables. Three major software programs were used: PreSuppose, Suppose, and FVSStand (Table B-1).

Table B-1. Software Utilized to Generate Yield Tables

Software	Program Size	Date of Software Version
PreSuppose	616 KB	4/5/99
Ls.exe version 1.10	1,284 KB	8/6/99
FVSStand.exe	316 KB	4/8/00
Suppose (FVS Setup Program)	397 KB	3/30/00
Y2c.exe	19 KB	2/19/99
PressSlf.exe	20 KB	6/1/00

- Software is available from the Ft. Collin's Washington Office Service Center of the USDA Forest Service at http://fsweb.ftcol.wo.fs.fed.us/tm/

The FLNF Assistant Forest Planner and the Forest Silviculturist attended the basic FVS (Forest Vegetation Simulator) training in 2003. A biometrician from the Ft. Collins Service Center conducted a service trip to the Forest in August 2003. During that visit, a field trip was conducted and FVS prescriptions were initiated. This was followed by a visit to Ft. Collins in February 2004 by the Assistant Forest Planner and the Forest Silviculturist. During the visit, prescriptions were modified, yield tables were initially developed, and the FVS model was modified to reflect growth projections, based on research (FIA) publications and Forest Plan monitoring data.

Yield tables were developed for different forest types based on the analysis conducted in 1982 by Wayne Kingsley. In the 1980s, growth and yield models for the Northeast had limitations, especially hardwoods. Kingsley utilized data from "A Silvicultural Guide for Northern Hardwoods in the Northeast," Table 4 and Figure 4 (Leak, Soloman, and Filip 1969), but made significant modifications based on current yield information. Future yields projections were based on current yields with increased yields due to silvicultural management. Increased yields were based on growth model projections and modified using professional judgment from silviculturists and research scientists.

The development of the yield tables had two objectives. The first was to provide the information necessary to display volume and stumpage value differences for each alternative analyzed. The second objective was to document the volume yields used in the analysis for comparison with actual yields obtained during implementation of the revised Forest Plan. This will require monitoring and evaluation to determine if the projected yields are actually being realized.

Stand data from the Combined Data System (CDS) was used for projecting growth. A stand inventory was conducted in 2001 for the FLNF so the data used was current. Prior to 2001, stand inventory data was more than 20 years old for most FLNF stands. Forest inventory data was also available from the Forest Inventory and Analysis (FIA) plots from the Northeastern Experimental Research Station in New Town Square, Pennsylvania. In 1996, FIA plots were obtained in Seneca and Schuyler counties, but no plots were installed on the FLNF. FIA data does not contain stand-level summary data, which serves as the basis for describing National Forest System lands. FIA data was used as a reference for growth projections made from the CDS stand data.

The CDS plot data was then translated into a format that was compatible with the FVS program using the Presuppose program. The Presuppose program groups the CDS stand plot data and converts it into data the FVS, whose Windows interface is called Suppose, can read. Plots can be grouped in almost any manner. PreSuppose also displays a summary of the plot groupings with associated forestry attributes (such as average trees/acre, total basal area, volume, diameter). Standard error percents are also given for each attribute.

The Suppose Program, the Windows interface of the Forest Vegetation Simulator (FVS), is a distance-independent, individual-tree-growing model. The Northeastern version of the model uses The Woodsman's Ideal Growth Projection System (TWIGS) equations to grow trees, modified to work in FVS. It requires plot data with individual trees identified by species and diameter at breast height (dbh). Important variables include the dbh, site species, and site index for the plot, and crown ratio and diameter growth increment for individual trees. Growth cycles were set at ten-year intervals as needed to create yield tables for SPECTRUM. The Forest Plan Silviculturist reviewed the FVS outputs. The outputs were compared with the Kingsley 1982 yield tables and modified based on monitoring results, FIA data and professional judgment.

FVSStand takes output from Suppose and groups it as needed for the desired yield tables, creating input for SPECTRUM. FVSStand allowed grouping the individual species and size classes together that comprise one market species group, such as mixed hardwood pulpwood or red oak sawtimber. Thus it was possible to identify the species and product combinations for which the Forest Service has market-based stumpage values.

The FVSStand option of creating "age dependent" yield tables was used with 10-year age classes. The 10-year age classes range from X1 to X0 (for example, age 61 to 70, 71 to 80, etc.). The plot groupings created in PreSuppose and processed with Suppose include plots with a range of age classes. Only those plots that met the age class requirements contributed to the volume yield table for that age class. Plots younger than the class are grown to meet the age requirements. If the age class for which a volume is calculated is 61 to 70, all plots younger that 71 years contribute to the yield. For example, the 31 to 40 year old plots were grown by the model into the 61 to 70-age class and the

harvest was simulated. The plots that were in the 61 to 70-age class at the time of measurement were not grown before the harvest was simulated.

FVS volumes are shown in cubic feet per acre and International ¼ inch board feet per acre in the yield tables. The volume equations and merchantability are those used in Region 9 cruise program. For cubic feet and cordwood equations the following citation was used: Gevorkiantz, S.R. and L.P. Olsen. 1955. Composite Volume Tables for Timber and Their Application in the Lakes States. USDA Forest Service Technical Bulletin No. 1104. For board feet equations the following calculation was used: Simmons 1942, International ¼ inch, Form class 80.

Minimum diameter at breast height (dbh) to qualify as sawlogs is 11.0 inches for hardwoods and 9.0 inches for softwoods. Associated minimum top diameters, inside the bark, are 9.6 and 7.6 inches, respectively. Pulpwood size materials have a minimum dbh of 5.0 inches for softwoods and 6.0 inches for hardwoods. Minimum top diameter (inside the bark) for pulpwood is 4.0 inches.

Several modifiers are available to improve the volume projections in FVS. The following modifiers were used to improve the growth projections. Readcord and Biamult are modifiers that change the diameter growth of individual trees. Mortmult and Fixmort are modifiers that change the rate of mortality for individual tree species. Yields were modified until projections approximated the Kingsley 1982 current yield projections.

The Kingsley 1982 current yields were based on yields by type of cut on the Forest for Fiscal Year 1980 and 1981. It was assumed that they represented medium productivity classes. Yields for the low and high productivity classes were estimated at 92 percent and 115 percent, respectively. Forest Plan annual monitoring data and FIA data was also referenced to judge FVS yield projections. This data was valuable to modify Kingsley's yield tables to reflect implementation of uneven-aged management and impact from standards and guidelines.

Kingsley predicted future yields by using yield information in "A Silvicultural Guide for Northern Hardwoods in the Northeast" (Leak et al. 1969) for volumes of managed northern hardwood stands. Since oak and northern hardwoods are very similar in stocking and growth characteristics, the northern hardwood yield tables were applied to oak. Future yields for softwoods were assumed to be the same as current yields.

In 2004, FVS projections were compared with Kingsley's steady state yields. Comparison for projections over 100 years is difficult. "Information About Old Growth for Selected Forest Type Groups in the Eastern United States" (Tyrrell et al. 1998) was used to predict stand attributes such as trees per acre, maximum tree diameter at breast height, total basal area, average tree age, average tree height, and standing dead trees.

It was believed that FVS modeling provided better predictions of future yields than the steady state yields used in 1982. FVS used CDS plot data to model future yield. FVS modeling is a tremendous technological improvement for growth and yield modeling. The FVS yield tables used in SPECTRUM are not perfect, but they represent the best predictions possible. Forest Plan monitoring will help judge these predictions overtime.

These yield tables were used in the modeling effort to determine the volumes harvested and stumpage received for both the benchmark runs and each alternative selected for the analysis. SPECTRUM was used to determine the appropriate prescription to apply to each forest type used based on management area direction and constraints. The existing forest type and harvest method was used to narrow and identify the choice of yield table.

Yield tables were divided into productivity classes, site index and site species to identify the correct productivity class to use. Once the forest type, harvest type, and productivity class were determined, the appropriate yield table was identified. To determine the volume of each species and product with its associated value, the stand age is used to correctly identify the appropriate value.

The yield tables were created for a specific forest type or group of forest types. When management area direction indicates stand conversion to another forest type is necessary, the new forest type would identify the successive yields. Natural succession from early to late seral stages was also conducted in this matter.

The actual yield tables are part of the record and are available upon request.

Management Actions

The management action component of the analysis process describes the activities that are applied to a land area to produce a desired outcome. Management actions have an objective or desired outcome which may or may not be a management action, such as:

- Produce as much timber as possible
- Produce as much wildlife habitat as possible
- Improve forest health, or
- A mix of the above

Management actions consist of a set of activities and the resulting output and conditions. They contain attributes, land themes, and schedules. Each management action contains a set of activities that are applied to the land to produce a set of outputs and conditions. Each management action has an emphasis and intensity attribute. The emphasis attribute describes the general management goal, and the intensity attribute describes the varying levels of management used to achieve the goal. For example, a timber emphasis might be regular rotations, 10 to 15 year cutting cycles to produce high-quality hardwood sawtimber. The management actions are used for modeling purposes only, however, and will not necessarily be carried into management direction in the Revised Forest Plan. The alternatives will determine which management area direction will be used and therefore which treatment type(s) may apply. Each management area has a different suite of acceptable treatment types.

Analysis Units

The analysis units component of the timber harvest analysis represents the land base input into the SPECTRUM model. The forest land area was divided into smaller homogeneous areas called analysis units. The analysis units component of the timber harvest analysis represents the land base input into the model. The planning area is divided into areas that facilitate land allocation and management scheduling analysis. The stratification is based on a set of layers used to describe the planning area. Layers may include: forest types, productivity classes, existing age classes, rotation lengths, regeneration harvest methods, wildlife habitat structure, and other management objectives. Forest planning chose analysis units that were homogeneous and scattered throughout the planning unit. Once a management action (described above) has been determined, the analysis units are grouped by themes. For example, non-native conifers within the oak hickory management area would be grouped for conversion to even-aged management of oak hickory. Non-native conifers within the northern hardwood management area would be grouped for conversion to uneven-aged northern hardwoods. The acreage figures in the analysis were derived from Geographic Information System (GIS) data, which differs from official land status acres by +/- two percent.

Costs & Returns

The costs of the timber program as well as its annual revenue were also components of the timber harvest schedule analysis. Timber program costs and FLNF annual revenue are described in Tables B-2 and B-3.

Table B-2. Timber Program Costs used in the SPECTRUM Model

Activity	Cost per Acre
Sale Preparation	$34.34
Sale Administration	$17.24
Road Maintenance	$ 0.74
Average	$52.32

Notes: The costs shown are in 1998 dollars. The data was obtained from the 1995-97 timber program cost analysis and represents the latest information available.

Table B-3. Green Mountain and Finger Lakes NF's Annual Revenue and Program Expenses (1995-1999)

Fiscal Year	Revenue	Annual Program Expenses
1995	$657,533	$840,000
1996	$966,785	$519,000
1997	$1,078,716	$529,000
1998	$1,066,902	$565,000
1999	$762,930	$404,000

Notes: Timber sales were not offered in 2000, 2001, 2002 and 2003.

In addition, the 1998 Green Mountain and Finger Lakes National Forest's cut and sold report was referenced as further background information to determine the appropriate mix of species/products. The 1998 data reflects a timber sales program of 5.8 million board feet. Later data was not used because it did not reflect an appropriate mix for Forest Plan revision projections. Stumpage prices were obtained from the New York Department of Environmental (DEC) website (stumpage prices – Region 6) 2004 and adjusted based on professional judgment.

Table B-4. Green Mountain and Finger Lakes Cut and Sold Report

1998 Sawtimber	MBF Harvested	2004 Value/MBF	Total Value
Spruce	1003	$240	$240,720
Red Pine	12	$48	$576
White Pine	54	$255	$13,770
Red Maple	500	$237	$118,500
Sugar Maple	1,000	$713	$713,000
Yellow Birch	484	$371	$179,564
Paper Birch	166	$80	$13,280
Beech	131	$186	$24,366
Ash	422	$257	$108,454
Aspen	10	$15	$150
Black Cherry	28	$619	$17,332
Red Oak	260	$578	$150,280
Total Sawtimber	4,070		$1,579,992

Constraints
Various constraints were then put into the model, giving the analysis parameters within which it could run. These constraints include limitations on harvesting, such as harvesting will only be modeled for areas where it is physically and legally feasible. Constraints may also be placed on management actions within analysis units. The constraint may specify a minimum, maximum, or a specific number of acres of an analysis unit that may be allocated to a set of management actions. Parameters on the types of treatment used in the model were also set. For example, clearcuts must retain nine trees per acre. These reserve trees must be selected from trees with the largest 50 percent of the diameters in the stand. In shelterwood treatments, overstory removals that normally occur within ten years after the initial shelterwood cut must also retain nine reserve trees per acre, with a preference to leave hickory, red oak, and hemlock. In the shelterwood with reserves method, when the overstory is removed in 40 years, nine reserve trees must be retained, similar to the other treatment types. An additional constraint is that the minimum harvest is 20 square foot. basal area per acre (BA) for all treatment types.

SPECTRUM Program
The linear programming (LP) model SPECTRUM (formerly known as FORPLAN) developed by K. Norman Johnson was selected as the primary analysis tool for National Forest scale planning. SPECTRUM is used to analyze different management alternatives. It optimizes the attainment of desired future conditions (DFCs) by scheduling activities that move existing conditions toward desired ones. This schedule is subject to meeting standards and guidelines (S&Gs), to imposed disturbance regimes, and to projected outputs and effects of time as a result of implementing the alternative. The major strength of this model is its ability to model the effects of constraints on outputs over time. The major limitations of this model are that activities and projected effects are not spatially explicit, and that input and outputs do not consider variability and uncertainty in the input data. SPECTRUM was used to determine the most cost effective schedule of treatments that would produce the desirable outputs and effects given DFCs (objectives) and S&Gs (constraints).

One component of SPECTRUM's analysis is "Resetting Stand Age." This refers to the model changing the stand age at the time of harvest. For example, in the partial cut treatments with regeneration, resetting the age of the stand would occur when the initial overstory is no longer present or when the overstory dies. The age would then be reset to the age of the new forest type that replaces the initial forest type.

Outputs from SPECTRUM analysis include the average annual allowable sale quantity (ASQ) for each alternative, the timber management schedules needed to achieve each average annual ASQ, and indicators for tracking specific types of wildlife habitat. The results of the SPECTRUM model will display how the Forest will look, in terms of species composition and age class distribution, for each alternative. The model will display a set of treatment methods that could be used to reach the desired conditions in each Management Area.

For example, the SPECTRUM model makes choices. From one treatment type (for example, shelterwood with previous thinning) the model could choose multiple stand treatments (for example, shelterwood removal in decade 4 versus decade 1). The model could also choose the length of each rotation.

The treatment modeled for one stand can be a sequence of treatment types. For instance, for a specific red pine stand, the outcome of the model, in terms of what treatment is appropriate, might be to either initially apply a thinning harvest that reduces the stocking and introduces regeneration, or the treatment may be a clearcut that converts it to a young stand of hardwoods and white pine. The next treatment could be a thinning harvest that either promotes the hardwoods or white pine.

SPECTRUM modeled a flat harvest, due to the effect of the Non-declining Yield (NDY) constraint. Without the NDY constraint, there is a natural tendency to have large harvests early, followed by a decline and then large harvests in the later planning periods. The NDY constraint severely dampens this natural tendency. When the harvest level is constrained to be below the long-term sustained yield (LTSY), the model finds the greatest value and harvest amount over the entire planning horizon by pushing the flat harvest level as high as possible.

Stage II Suitability Analysis for the Finger Lakes National Forest

Stage II suitability analysis requires an estimate of the suitability of forest land to produce wood products cost effectively. The appropriate economic measure of cost effectiveness is the present net value (PNV) of all revenues and receipts received from land over the planning horizon, which for the FLNF is 150 years. The forest lands comprising the FLNF include a wide range of tree productivity from highly productive lands to lands that can not produce a commercial crop of timber. The tree species on the FLNF have a wide range of commercial value. Highly valuable species include red oak, sugar maple, white ash, and black cherry. Species such as aspen and black locust have little commercial value.

To perform the stage II analysis the SPECTRUM computer model was used to simulate the harvest and regeneration of trees over the next 150 years using a variety of different silviculture and vegetation management methods as specified by the planning team. These were the same methods considered for Forest Plan revision. SPECTRUM provided the following outputs used for this analysis: timber yields, costs, revenues, and the associated net present value.

Present net value is the criterion for determining the economic efficiency of timberlands. All of the vegetation cover types were reviewed by SPECTRUM. SPECTRUM determined that all vegetation cover types were above cost, except aspen and black locust. The only silviculture prescription assigned to aspen was clearcut or no management. The SPECTRUM analysis determined that every acre of aspen and locust clearcut had a negative PNV.

Aspen and locust are short-lived species that could be lost through natural succession to oak/hickory or northern hardwoods on the FLNF. The replacement of aspen and locust to hardwoods would improve the PNV during the 150-year planning horizon. This would not meet Forest Plan vegetative objectives since aspen provides important wildlife habitat. The Forest Plan has an objective of regeneration three to five acres annually with commercial timber sales or with non-commercial chainsaw felling of aspen regeneration.

Although regeneration of aspen through commercial timber sales would have a negative PNV, it is more cost effective than hand tree felling of aspen with no timber removal. Timber sale appraisals of aspen clearcutting have shown an average cost of $135 per acre to accomplish this work by a logging contractor. This work is funded through reduced stumpage receipts received by the government. Timber sale bidders make their own estimates of the required work on timber sales and adjust their bids for stumpage. The felling of trees within shrub openings was conducted by cooperators in 1994, which has similar costs. The Forest Service estimates that it costs $150 to $250 per acre to accomplish this work by contractors or cooperators.

Black locust was planted in the 1930s as a source of fence posts for FLNF pastures. There has been no harvesting of black locust except by the Forest Service for fence posts. There is local interest to conduct commercial timber sales of locust in the future. Locust heartwood is resistant to rot and does not need chemical preservatives. A local group expressed interest in establishing a black locust demonstration area on the FLNF. Forest Service staff determined that aspen and locust should remain as suitable timberlands.

Economic Impact Analysis

Introduction

This portion of the Analysis Process Appendix provides additional details regarding the economic impact analysis. It should provide the reader with a general understanding of the methodology used and some of the models employed in the process. In this context, economic impacts refer to the effect, or impact, a change in the economic environment will have on jobs and income. The changes that are introduced to the economic environment reflect the changes in activity levels, such as recreation use and levels of timber harvest, that are present in each of the alternatives. These various levels of activity cause the number of jobs and income to change. Comparing the levels of change in income and employment from current and between alternatives provide the basis for most of the economic effects analysis in Chapter 3.

Defining the Economic Impact Analysis Area

The economic impact analysis area was defined as the two counties in which the Finger Lakes National Forest is located, Seneca County and Schuyler County in New York. Since the FLNF is geographically centered within these two counties, the counties are well connected through public road networks, and activities on the FLNF are generally spread throughout the Forest, it is reasonable to consider the counties as one economic area rather than as separate economic areas. Most of the data available for economic research is available at the county level, and therefore, the two counties provided a reasonable area in which to examine the economic activity and measure the Forest's economic impact. Seneca and Schuyler counties include all of the towns adjacent to the FLNF as well as some other larger communities that are geographically separated from the Forest but tend be a primary source for goods and services for the adjacent communities. The most significant economic impacts of activities on the Forest can often be felt by communities adjacent to or in close proximity to the Forest. The analysis of the impacts in the two counties will provide general information on the economic impacts of Forest Service activities in the area adjacent to the FLNF.

Economic Impact Analysis Methodology

IMPLAN Model

The economic effects to the two county region were estimated using an economic input-output model developed with IMPLAN Professional 2.0. The early version of this software was originally developed by the USDA Forest Service and has since been taken over by a private company, Minnesota INPLAN Group, Inc. (MIG, Inc.). The model uses national input-output tables from the Bureau of Economic Analysis (BEA), secondary economic data at the county level from a variety of public sources, and proprietary procedures to develop an input-output model for a study area.

The Regional Economist assisted the Finger Lakes National Forest in developing the IMPLAN model. The income and employment data was derived from 2003 data, the most recent available data at the time this was completed. Subsequent analysis was performed using an electronic worksheet tool (FEAST). FEAST was developed by the USDA Forest Service's Inventory and Monitoring Institute to apply the coefficients and multipliers generated in INPLAN to varying levels of inputs by alternative and display the outputs in terms of impacts on employment and labor income.

The impacts to local economies in the model are expressed in terms of employment and labor income. Income is expressed in terms of labor income dollars generated by forest activities and related employment. Employment is expressed in jobs; a job can be seasonal or year-round, full-time or part-time. The number of jobs is computed by averaging monthly employment data from state sources over one year. The income measure used was labor income in 2003 dollars. Labor includes both employee compensation (pay plus benefits) and proprietor's income (for example, profits by self-employed).

Timber
Information on timber stumpage values was provided from recent sales on the FLNF and the New York State Department of Environmental Conservation report of stumpage values to determine stumpage values shown in Table B-4.

Recreation
Estimating the economic impacts on the Forest involved the following steps:

1. Determining how many visitors by recreation activity recreate on the Forest in a year. The 2000 National Visitor Use Monitoring Survey (NVUM) (USDA Forest Service 2001) provided the data for the number of visitors and their activities.
2. Determining how much money the average visitor spends within the analysis area, by recreation activity, on a daily basis. This is referred to as a spending profile. Spending profiles by recreation activity were developed from NVUM data (Stynes and White 2004). Recreational spending categories and the number of visitors a year in each category are shown in Table B-5.
3. By recreational activity, multiply the number of visits by activity's spending profile to estimate the amount of money recreational visitors spend in the course of a recreational visit to the Forest.

Inputs and Outputs
Table B-5 provides a display of some of the inputs that were used in the economic impact analysis. Both the current situation and each of the alternatives is shown. Fiscal Information is based on 2003 revenues and expenditures.

Economic Impact Analysis Results
The results of the economic impact analysis are expressed in terms of jobs and income. The analysis looks at this from two perspectives. One perspective is the impact the activities that are occurring on the Forest have on sectors of the local economy in terms of jobs and income. Another perspective looks back at the Forest Service, uses some general categories of resource management within the Forest Service's functional organization, and attributes the changes in jobs and income to those resource areas. In a loosely defined fashion, this sets up a cause and effect relationship between the changes by resource area (for example, manufacturing or services). This cause and effect relationship oversimplifies the complexity of all of the impacts that an activity has within the IMPLAN model. In fact, the impacts are often spread over hundreds of sectors and sub-sectors. Therefore, the cause and effect is not a one-to-one relationship. General cause and effect relations are, however, evident in the results. The economic effects analysis section of chapter 3 provides detailed tables and interpretation of the results by alternative.

Table B-5: FEAST Spreadsheet Inputs					
Resource Area	**Category**	**Current Situation**	**Alt 1**	**Alt.2**	**Alt 3**
Recreation	Non-local day trips	3,917 visits	3,917 visits	3,917 visits	3,917 visits
	Non-local overnight on the NF	979 visits	979 visits	979 visits	979 visits
	Non-local overnight	4,406 visits	4,406 visits	4,406 visits	4,406 visits
Fish & Wildlife oriented recreation	Non-local day trips	435 visits	435 visits	435 visits	435 visits
	Non-local overnight on the NF	109 visits	109 visits	109 visits	109 visits
	Non-local overnight	490 visits	490 visits	490 visits	490 visits
Range	Cattle & Horses	9,432 HMs	9,705 HMs	9,510 HMs	9,510 HMs
Timber	Softwood saw	10 CCF	173 CCF	61 CCF	127 CCF
	Softwood pulp	100 CCF	58 CCF	22 CCF	37 CCF
	Hardwood saw	112 CCF	305 CCF	42 CCF	139 CCF
	Hardwood pulp	200 CCF	208 CCF	40 CCF	124 CCF
	Other products	100 CCF			
Revenues Retained by FS in Thousands (1,000)					
Recreation		$2	$2	$2	$2	$2
Timber & Roads		$24	$173	$39	$100
Minerals		$4	$4	$4	$4
FS Budget Expenditures by Program in Thousands (1,000)					
Recreation		$179	$179	$179	$179
Timber		$85	$448	$250	$315
Soil, Water & Air		$47	$47	$47	$47
Range		$91	$91	$91	$91
Minerals		$2	$2	$2	$2
Protection		$466	$466	$466	$466
Wildlife & Fish		$111	$111	$111	$111
FS Employment	Permanent	5	6	6	6
	Other than Permanent	1	2	1	1

Economic and Financial Efficiency Analysis – Present Net Value (PNV)

Introduction

The economic and financial efficiency analysis evaluates the alternatives in terms of their net public benefit. Net public benefit is defined as the "… overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index" (36 CFR 219.3). The first measurement in net public benefit uses quantitative criteria and is included in the financial efficiency analysis. Financial efficiency considers the value of activities and products that have a market cost or value. Essentially, financial efficiency considers things that can be bought or sold. The qualitative criteria are included as a part of the economic efficiency analysis and considered the public's perceived worth of various activities in the form of assigned values. In this context, these various activities are generally recreation activities. The final economic analysis combines the qualitative criteria with the quantitative analysis using their Present Net Value (PNV) to estimate an alternative's overall net public benefit.

Methodology

The economic and financial efficiency analysis uses many of the inputs used in the economic impact analysis for the first decade. The economic and financial efficiency analysis extends the time horizon on these inputs to a period of 150 years instead of the average annual for the first decade of implementation, which was used in the economic impact analysis. The PNV calculation, using an annual discount rate of four percent, is then calculated over the entire 150-year period to estimate the long-term value.

PNV Inputs and Assumptions

Recreation

The first decade of input by recreation activity uses visitation and Recreation Visitor Days (RVD) developed from the 2000 NVUM data. Recreation Visitor Days (RVD) are determined by converting the number of visitors to a standardized unit of measure using an activity dependent length-of-stay factor. The 2000 figures were then projected to 2004 RVDs using 10 year growth rate projections from Chapter VI of "Outdoor Recreation in American Life: A National Assessment of Demand and Supply Trends" (Cordell 1999). Assigned values by activity were established using values from a USDA Forest Service report "Resource Pricing and Valuation Procedures for Recommended 1990 RPA Program." This report evaluated the "market-clearing price", which approximates the price a good would sell for in a competitive market. This valuation technique was applied to "goods" not normally marketed. The "goods" in this case are recreation visitor days (a twelve hour equivalent stay or visit) by recreational activity on the Forest. These values were adjusted from 1989 values, when the study was completed, to 2004 values using a gross domestic product (GDP) deflator inflation index value of 1.3246 (NASA 2004). The 2004 RPA Program values are shown in Table B-6.

Timber

Revenue from timber sales were obtained from SPECTRUM model outputs gross revenue by decade. Timber program costs were developed assuming the staffing levels would adjust to execute the maximum harvest permitted under the ASQ for each alternative.

Other Programs

Costs and revenues for other programs are assumed constant through the alternatives. Any changes in costs or revenues for one of these programs are assumed to be offset by another program and would not affect the cumulative results.

Table B-6: Recreation Use Inputs		
Recreation Activity	**Assigned Values/ RVD**	**10 Year Projected Growth Rate**
Camping Picnicking Swimming	$19.19	5.5%
Mechanized travel and viewing scenery	$14.41	15.0%
Hiking, Horseback Riding, and water travel	$22.27	9.8%
Winter Sports	$58.34	5.2%
Resorts	$24.01	
Wilderness	$28.66	-2.4%
Other rec (except wildlife & fish)	$84.09	17.0%
Hunting	$61.67	3.0%
Fishing	$104.31	5.0%
Nonconsumptive Wildlife Uses	$59.68	18.0%
Sources: Assigned values – Resource Pricing and Valuation Procedures for the Recommended 1990 RPA Program (USDA Forest Service 1990) 10 year projections - Chapter VI of "Outdoor Recreation in American Life: A National Assessment of Demand and Supply Trends" (Cordell 1999)		

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APPENDIX C WILDERNESS

Wilderness Evaluation

The Finger Lakes National Forest (FLNF) has a land use history that has given a distinctive, and distinctively roaded, appearance to the landscape. In the late 18th century, what is now the FLNF had been promised to New York veterans of the Revolutionary War as payment for their services. To meet their obligation, the State proposed to create the "New Military Tract" in 1782 on what is now the FLNF. This military tract divided the landscape in grid-like fashion and placed roads approximately every square mile. There are no existing wilderness or primitive areas on the FLNF.

The Finger Lakes National Forest, during its Plan revision process, identified what FLNF lands, if any, satisfied the 1964 Wilderness Act's definition of wilderness. According to this statutory definition, potential wilderness areas must be "untrammeled," meaning the area is unhindered and free from modern human control or manipulation, "natural," meaning its ecological systems are substantially free from the effects of modern civilization, and must provide outstanding opportunities for solitude or a primitive and unconfined type of recreation.

Roadless areas also qualify for designation as potential wilderness if, in addition to meeting the statutory definition of wilderness, they meet at least one of the following criteria found in Chapter 7 of the Forest Service Land and Resource Management Planning Handbook (USDA Forest Service 1992):

- They contain 5,000 acres or more
- They contain less than 5,000 acres but:
  - are manageable in their natural condition due to physiography or vegetation.
  - are self-contained ecosystems such as an island.
- They are contiguous to existing wilderness, primitive areas, or roadless areas under other federal jurisdiction.
- They do not contain improved roads maintained for travel by standard passenger vehicles, except as permitted in areas east of the 100th meridian.

There are no areas on the FLNF containing 5,000 acres or more. Most blocks of land on the Forest are small, averaging approximately 600 acres. These small blocks of land are not manageable as wilderness in their natural condition, and are not self-contained ecosystems. There are three blocks of land within the FLNF that are approximately 1,000 acres in size, and the largest core, roadless block of land on the Finger Lakes National Forest is approximately 2,500 acres. These larger roadless blocks are unmanageable as wilderness because most contain large blocks of private land, some contain developed campgrounds, and the 2,500-acre block is divided by a multiple-use trail used by horses as well as snowmobiles.

Therefore, there are no proposed additions to the National Wilderness Preservation System in this Finger Lakes National Forest Plan revision.

APPENDIX D WILD AND SCENIC RIVERS

Wild and Scenic River Evaluation

The Finger Lakes National Forest (FLNF) contains no rivers eligible for inclusion in the National Wild and Scenic Rivers System (NWSRS). The current Plan revision does not propose any additions to the NWSRS.

The 1968 Wild and Scenic Rivers Act directs federal agencies to identify eligible Wild and Scenic Rivers (WSR) in their planning processes. Rivers are eligible for Wild and Scenic status if they are free-flowing, and possess one or more "outstandingly remarkable" values – scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values.

Most streams on the FLNF are intermittent, since the Forest is at the top of the watershed, and only extends an average of four miles from east to west. Streams on the FLNF were evaluated for WSR eligibility during the 1987 Plan, and none were declared eligible at that time. In the Plan revision process, the Forest Service looked again at all rivers not declared eligible, to see if significant changes in these rivers would allow them consideration as potential Wild and Scenic Rivers. The Forest Service found no significant changes to warrant considering any rivers for Wild and Scenic River status. Although the FLNF has acquired land during the last planning period, there are no new, unstudied streams on these newly acquired lands. Due to the lack of potentially eligible streams, further WSR evaluation was not conducted at this time.

Appendix E – Biological Evaluation

Biological Evaluation
of the
Finger Lakes National Forest
Land and Resource Management Plan Revision
on
Federal Endangered, Threatened, and Proposed Species
and Regional Forester Sensitive Species

Seneca and Schuyler Counties, New York

USDA Forest Service
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Chapter 1 – Purpose and Need

Introduction

This Biological Evaluation (BE) is prepared in accordance with policy provided in Forest Service Manual (FSM) 2672.42 and Section 7 of the Endangered Species Act (ESA). This policy is designed to avoid impacts that may cause a trend toward listing of a species under the Endangered Species Act, or loss of species viability. The purpose of this document is to determine the potential effects of the revised Finger Lakes National Forest (FLNF) Land and Resource Management Plan (Forest Plan), and its alternatives, on federally-listed threatened, endangered, and proposed (TE) species, and Regional Forester sensitive species (RFSS), that may occur within the FLNF. The need for revision of the FLNF Forest Plan is triggered by regulations under the National Forest Management Act of 1976 (NFMA) that require Forests to evaluate and revise their management plans every 10-15 years; the current FLNF Forest Plan was originally approved in 1987.

Federally endangered and threatened species are those determined for eligibility based on guidelines listed by the United States Department of Interior Fish and Wildlife Service (USFWS) under Section 4 of the Endangered Species Act. The FLNF cooperated with the USFWS to determine which federally-listed species to evaluate in this Biological Evaluation (USFWS 2004). Species included on the Regional Forester sensitive species list must occur on Forest Service land or within the proclamation boundary of the Forest, and meet at least one of the following criteria: 1) are a candidate for federal listing under ESA; 2) have been delisted under ESA within the last five years; 3) have a global (G), national (N), or trinomial (T) rank of 1, 2, or 3 from the Association of Biodiversity Information; or 4) are otherwise considered “at risk” on the Forest, with rationale documented in a Risk Evaluation. Development of the most recent RFSS list for the Finger Lakes National Forest (USFS 2003) was based on reviews of field data and literature conducted by the Forest Service in cooperation with the New York Natural Heritage Program, the New York Division of Fish, Wildlife, and Marine Resources, local interest groups, and other cooperators.

The Finger Lakes National Forest also conducted a Species Viability Evaluation (SVE) as part of Forest Plan revision (USDA 2004b). This was a qualitative process to identify and gather information about vertebrate, invertebrate, and plant species of potential viability concern on the Forest, including threatened, endangered, and sensitive species. The evaluation involved compilation of information from scientific literature and consultation with local wildlife and botanical experts, including state agencies, faculty at local universities, and Forest Service researchers. As part of the process, local experts were asked to evaluate the current condition of each species and determine the degree to which ecological conditions on the FLNF may contribute to species viability currently and over the next 20 years. The evaluation by the panels and information contained in the literature compilations were valuable in helping to analyze the effects of implementing the revised Plan and its alternatives on threatened, endangered, and sensitive species. Species of potential viability concern that are not currently listed as TE or RFSS are addressed in Section 3.8 of the FLNF Draft Environmental Impact Statement for revision of the Forest Plan.

Proposed Management Action and Alternatives

As required by the NFMA, the Finger Lakes National Forest proposes to revise the 1987 Forest Plan for all of the resources managed by the Forest. The Code of Federal Regulations (36 CFR 219.10[g]) implementing the NFMA instructs the Regional Forester to make periodic revisions to the plan. The existing Forest Plan was approved on January 15, 1987, and there have been three amendments to this plan.

Federal law, regulations, and policy provide guidance and direction for natural resource management activities on National Forests. Within this context, the Forest Plan does not identify site-specific actions, but provides a framework within which future activities may be implemented. The Forest Plan does this by identifying goals, objectives, standards, guidelines, management areas (MAs), and monitoring requirements for the ten-year planning period, which begins when the Forest Plan is approved. Goals and objectives form the basis for developing and implementing projects to make progress towards the desired future condition of the land and its resources. Standards and guidelines provide more detailed direction on how project activities may be conducted, and are usually more specific than those found in laws, regulations, and policies. The Forest Plan also allocates land to specific MAs, each with a different resource emphasis and desired future condition, although much overlap can exist.

The revision of the FLNF Forest Plan involved assessments of resource conditions, including review of the most current scientific literature available, and extensive public involvement through public meetings, public forums and field trips. A goal for Forest Plan revision was to develop one set of Forest Plan goals, objectives, standards, guidelines, management areas, and monitoring requirements that were consistent with laws, regulations, and policies, while meeting public needs and desires and local resource conditions on the Forest. These aspects of management direction for the revised Forest Plan are discussed in detail in Chapter 2.

Another goal of Plan revision was development of alternative approaches to allocating the lands within the Forest to each of the different management areas, in order to provide a range of options for meeting public interests and resource needs. These alternatives are based on issues raised by the public and the Forest Service. During the revision process, concern arose from the public and the Forest Service relative to three primary issues; these were noted in the Forest Service's Notice of Intent to revise the Forest Plan (USDA 2001). These issues, which are presented in detail in Chapter 1 of the Draft Environmental Impact Statement (DEIS), are summarized as follows:

1. **Biodiversity and ecosystem management:** provide appropriate quantity, quality, distribution, and diversity of habitats for wildlife and threatened, endangered, and sensitive species, as well as threats to these species (for example, non-native invasive species)
2. **Recreation management:** provide an appropriate mix of recreation opportunities, including backcountry and low-density recreation, more developed, higher-density recreation, as well as motorized and un-motorized trail use, and separation of conflicting uses
3. **Timber management:** determine the appropriate level for timber harvesting to maintain and enhance vegetative diversity, wildlife habitats, vistas, health and condition of the forest ecosystem, and to produce high quality sawtimber, including establishing methods and uses for vegetation management, the desired mix and location of various vegetative age and composition, and the identification of lands where natural processes will determine the composition and structure of the forest

Based on these issues, the Forest Service developed five alternatives for the revised Forest Plan. These alternatives are described in detail in Chapter 2 of the DEIS and summarized as follows:

Alternative 1 - Current Management Alternative:
Alternative 1 is the "Current Management," or the "No Action" alternative. Under this alternative, recreation management, timber management, and biodiversity and ecosystem management would remain very much as they presently are in the 1987 Plan. There would be some improvements in each category due to the assignment of the newly acquired lands (MA 9.2) to management areas. Under the 1987 Forest Plan, newly acquired lands had no active management. Designation of these lands enables application of appropriate land management activities.

Biodiversity and ecosystem management would be slightly enhanced due to the designation of the newly acquired lands into management areas, allowing habitat and vegetation management.

Timber management opportunities would improve with the assignment of some of the newly acquired lands to management areas that allow timber harvesting. Timber management opportunities also would improve by changing the focus of MA descriptions to desired future conditions rather than the silvicultural tool used to achieve those conditions.

Improvements over the 1987 Plan would potentially include future trails and other recreational opportunities. Management Area descriptions do not explicitly prohibit trail development. Motorized use is prohibited within several specific Special Areas.

Alternative 2
Alternative 2 maintains less shrubland and more grassland for wildlife than Alternative 1. Grassland and shrubland habitat contributes to the biodiversity on the Finger Lakes National Forest. Under this alternative, some grassland areas maintained by cattle grazing in Alternative 1 will be maintained instead as grassland for wildlife, without grazing. Several small areas allocated to shrubland in the current Plan are proposed to revert to forest.

These are areas that are currently forested, even though they are in the Shrubland MA. Re-allocating these lands to forested MAs would create a larger contiguous forested area.

Alternative 2 includes the least opportunity for timber harvesting, primarily by allocating the most acres to the Future Old Forest MA, which does not allow timber harvesting. Alternative 2 also includes the largest allocated to the Northern Hardwood MA. This MA will be used in visually sensitive areas but also for promoting larger blocks shade tolerant northern hardwoods. Alternative 2 includes the least opportunity for oak management. This alternative would result in the largest amount of closed canopy forest of the three alternatives.

Recreational trail opportunities under Alternative 2 are outlined through the Trails Analysis Process (Appendix F, DEIS). This process identified three trails for future site-specific study. In general there will be less opportunity for future motorized trails in Alternative 2 than in Alternatives 1 and 3. This is primarily because of the large allocation of acres to the Future Old Forest MA in Alternative 2. Mountain biking would be allowed on all multiple-use trails.

Alternative 3

Alternative 3 includes the same number of acres in grassland as Alternative 2. Alternative 3 includes 154 more acres of shrubland than Alternative 2, but 686 fewer acres of shrubland than Alternative 1. As described above, some of these shrubland areas are currently forested, and re-allocating them to forested MAs would create a larger contiguous forested area. Management in the forested landbase focuses on oak, northern hardwoods, and areas without timber harvest.

Alternative 3 makes slightly fewer acres available for timber harvesting than does Alternative 1. This alternative would result in more closed canopy forest than Alternative 1, but less than Alternative 2. Management opportunities focusing on shade tolerant northern hardwoods would be greater than Alternative 1, but less than Alternative 2. Conversely, Alternative 3 has less forested land available for oak management than in Alternative 1, but more than in Alternative 2.

Recreational trail opportunities under Alternative 3 are outlined through the Trails Analysis Process (Appendix F, DEIS). This process identified three trails for future site-specific study. Alternative 3 includes less opportunity for future motorized trails than does Alternative 1, but more than Alternative 2. The primary difference between Alternative 2 and Alternative 3 in this regard is the fewer acres allocated in Alternative 3 to the Future Old Forest MA, in which new motorized trails would be prohibited. Under Alternative 3, mountain biking would be allowed on all multiple-use trails.

Preferred Alternative

Alternative 3 is the Preferred Alternative for revising the FLNF Forest Plan. This alternative is described in detail in Section 2.1.7 of the DEIS and is summarized above. It includes the elements common to all alternatives described in Section 2.1.4 of the DEIS, which are summarized below in Chapter 2 of the BE and include the management direction, land allocation descriptions, standards and guidelines for management practices, and monitoring and evaluation plan of the Proposed Forest Plan.

Consultation History

The Forest Service consulted with the USFWS during 1999 through 2001, regarding potential impacts of management activities under the 1987 Forest Plan on the Indiana bat and other threatened or endangered species (USDA 2000). In particular, this consultation responded to new information about the possible presence of Indiana bats on or near the GMNF. In December 2000, the USFWS (USFWS 2000) concluded that continued implementation of the 1987 Plan was not likely to adversely affect the Indiana bat and should have no effect on the bog turtle, bald eagle, eastern cougar, gray wolf, and Leedy's roseroot. No terms or conditions were recommended for inclusion in the 1987 Plan.

Informal consultation with the USFWS began in August 2004, with the Forest Service request for an updated list of endangered, threatened, and proposed species, as well as critical or proposed critical habitat that needs to be considered during the revision of the 1987 Plan (USDA 2004a). USFWS replied with that list in September 2004 (USFWS 2004). This list is being used in the Forest Service's ongoing evaluation of the Forest Plan revision process.

Species Evaluated

Table E1-1 lists the 21 endangered, threatened, or sensitive species to be evaluated in this Biological Evaluation. Because this is a programmatic document based on proposed management direction across the entire FLNF, all species listed as federally endangered, threatened, or as sensitive for the FLNF are included in this evaluation. This list is based on consultation with the USFWS (2004) and on the Regional Forester Sensitive Species List as updated in 2003 (USFS 2003u). No species currently proposed for listing under the ESA occur on the FLNF, and the FLNF includes no critical habitat for any listed species (USFWS 2004).

Table E1-1. Endangered, Threatened, and Sensitive species that may occur on the Finger Lakes National Forest.

Common Name	Scientific Name	U.S. Status[1]	NY Status[2]
MAMMALS			
Gray wolf	*Canis lupus*	T	E, X
Eastern cougar	*Felis concolor cougar*	E	E, X
Canada lynx	*Lynx canadensis*	T	T, X
Indiana bat	*Myotis sodalis*	E	E
Eastern small-footed bat	*Myotis leibii*	S	SC
BIRDS			
Bald eagle	*Haliaeetus leucocephalus*	T	T
Northern goshawk	*Accipiter gentilis*	S	SC
Henslow's sparrow	*Ammodramus henslowii*	S	T
Upland sandpiper	*Bartramia longicauda*	S	T
Northern harrier	*Circus cyaneus*	S	T
REPTILES			
Bog turtle	*Clemmys muhlenbergii*	T	E
MOLLUSKS			
Green floater	*Lasmigona subviridis*	S	T
INSECTS			
West Virginia white	*Pieris virginiensis*	S	
PLANTS			
Wild onion	*Allium cernuum*	S	T
Wild indigo	*Baptisia tinctoria*	S	
Butternut	*Juglans cinerea*	S	
Water-marigold	*Megalodonta beckii* var. *beckii*	S	T
Broad beech fern	*Phegopteris hexagonoptera*	S	V
Black-fruit mountain-ricegrass	*Piptatherum racemosum*	S	
Leedy's roseroot	*Sedum integrifolium* ssp. *leedyi*	T	E
Culver's-root	*Veronicastrum virginicum*	S	T

Notes:
[1] Listed by the USFWS under the federal Endangered Species Act: E is Endangered; T is Threatened; S means listed by the Regional Forester of Region 9 as Sensitive for the FLNF.
[2] Listed by the State of New York under their Endangered Species Statute: E is Endangered; T is Threatened; X is extirpated; SC is for species of Special Concern; V is exploitatively Vulnerable.

Chapter 2 – Overview of Management Context

This chapter provides a description of the planning area in which threatened, endangered, and sensitive (TES) species occur, and provides an overview of the management direction provided by the revised Forest Plan. This management direction consists of goals and objectives for management of the FLNF, and standards and guidelines that govern how management activities are conducted. Direction is also provided for management areas, and includes the emphasis and desired future conditions of the lands within that management area, and more specific standards and guidelines for management activities. This direction is the same across all alternatives; the variation in alternatives is based on how the management areas are distributed across the FLNF, and the effects of those variations are discussed below in the analysis of effects of Chapter 3 and 4.

Description of the Planning Area

The FLNF encompasses approximately 16,439 acres of Seneca and Schuyler Counties, and is located in New York's Finger Lakes Region. Chapters 1, 2, and the Affected Environment Section in Chapter 3 of the FLNF Plan Revision Draft Environmental Impact Statement (Forest Plan DEIS) contain a description of the physical, biological, social, and economic environment. A summary is provided below.

Landscape Characterization

In a global context, the central Finger Lakes region sits within the temperate deciduous forest biome (global ecological communities), which covers much of eastern North America, Western Europe, and eastern Asia. The National Hierarchical Framework of Ecosystem Units (Cleland et. al. 1997) classifies and maps ecological units based on associations of different factors. These factors include climate, topography, soils, water, and potential natural communities. In the national ecological framework, the Finger Lakes region sits within a transition zone between two primary ecological regions, the Erie and Ontario Lake Plain Section of the Eastern Broadleaf Forest Province to the north towards Lake Ontario, and the Northern Glaciated Allegheny Plateau Section of the Laurentian Mixed Forest Province to the south toward the Allegheny Mountains. Over 98% of the Finger Lakes National Forest occurs within one subsection of the Erie and Ontario Lake Plain Section, the Cattaraugus Finger Lakes Moraine and Hills Subsection. This subsection is transitional in nature, becoming increasingly mountainous moving from the Ontario Lake Plain into the Allegheny Plateau. The FLNF resides between Seneca and Cayuga Lakes within this ecoregion.

Within the Cattaraugus Finger Lakes Moraine and Hills Subsection, the terrain is dominated by rolling hills resulting from glacial ground moraine and kame deposits (Keys et. al. 1995, DeGloria et. al. 1999). Landscapes, as defined by the FLNF Landtype Association (LTA) map developed by DeGloria et. al. (1999), include morainal and hilly areas with lowlands, shale ravines, and small side slopes characteristic of the transition zone the subsection represents; high plateaus and side slopes along the "Backbone" more characteristic of the Allegheny plateau; and till and lake plains more characteristic of the Ontario Lake Plain. Elevations range from 400 to 2,000 feet with deep post-glacial lakes scattered throughout (one, Seneca Lake, is adjacent to FLNF). Soils tend to be derived from late Wisconsinan loamy till, with minor alluvium and kame deposits, and include a mix of more fertile and nutrient rich soils as well as more acidic and colder soils. Mean annual precipitation is 33 inches per year, evenly distributed, and the growing season lasts about 151 days (Keys et. al. 1995; DeGloria 1998).

Closer to the lakes and the northern end of the FLNF within the Ontario Lake Plain, the terrain is characterized by lowland lake and till plain landscapes formed through deposition of lake silts and glacial outwash (Keys et. al. 1995). Soils are formed from late Wisconsinan till, and tend to be fertile and nutrient rich from glacial lake sediments. Deep, post-glacial lakes tend to be a dominant feature of this ecoregion, and in the FLNF area include Seneca and Cayuga Lakes, as well as Lake Ontario.

History and Land Use

Prior to settlement by European settlers, the Finger Lakes region was first occupied by native peoples approximately 12,500 years ago. Land use by native peoples started as hunting and gathering, but evolved over time from subsistence practices toward horticulture and permanent settlements. The FLNF is located in what was a boundary area between the Seneca and Cayuga Nations of the Iroquois Confederacy. Cayuga villages to the east of the FLNF date from about 1600 AD or earlier, while Seneca villages date to 1700 AD or later. An Iroquois road is known from along the east side of Seneca Lake, heading toward settlements and agricultural fields to the north, but no settlements or encampments are known from the FLNF. However, a military action, known as the Sullivan campaign of 1779, led to the devastation of the Iroquois in this area. Soldiers of the campaign raided

Iroquois settlements throughout the Finger Lakes region, burning villages, cornfields, and orchards along both Seneca and Cayuga Lakes. During land surveys of the 1790s, evidence of settlements and the campaign were present, but few native peoples were noted (Marks and Gardescu 1992).

The area around the FLNF was promised to New York veterans of the Revolutionary War as payment for their services, and so the state created a Military Tract in 1782. The land was surveyed during the 1790s, and settlement started in earnest during the first three decades of the 1800s. The distribution of the lots within the Military Tract included terms and conditions requiring "improvement" within five years of acquisition, which led to land clearing of forests and establishment of agricultural fields of hay and small grains. Agricultural production peaked in the area just before the Civil War. By the mid-1800s, agriculture and lumber production were important industries in the area. Over 145 mills were operating in the central Finger Lakes area. By the 1880s, land cleared for timber and agriculture peaked statewide (DeGloria 1998). However, with the opening of the Midwest in the late 19th century, the region entered a sharp economic and populations decline as farmers relocated to more ideal lands.

Between 1890 and the Great Depression, over a million acres of farmland were abandoned in south central New York State. In the 1930's it was recognized that farmers in many parts of the country could no longer make a living from their exhausted land. Environmental damage was occurring as they cultivated the land more and more intensively to make ends meet. Several pieces of legislation were passed, including the Emergency Relief Act of 1933 and the Bankhead-Jones Farm Tenant Act of 1937 to address these problems. One result was the formation of a government agency, the Resettlement Administration, to carry out the new laws. This agency directed the relocation of farmers to better land or other jobs, and the purchase of marginal farmland by the Federal Government. Between 1938 and 1941, over 100 farms were purchased for what is now the FLNF (DeGloria 1998).

The Soil Conservation Service initially managed the newly acquired federal land, named the Hector Land Use Area (LUA). The emphasis was on stabilization of the soil by planting conifers, and development of a cooperative grazing program. Previously cultivated fields were converted to improved pastures to demonstrate how less intensive agriculture could still make productive use of the land (DeGloria 1998).

By the 1950's, many of the original objectives of the Hector Land Use Area had been met. Farmers had been resettled, the eroding soil stabilized, and alternative agricultural uses demonstrated. At the same time, the public was becoming interested in the concept of multiple uses of public lands. Management and appropriate ownership of the Hector LUA was reevaluated. The decision was made in 1954 to transfer administration responsibilities to the United States Forest Service, which already had a fairly long history of multiple use management (USDA 2000).

In 1982, the federal land management agencies were directed to identify isolated parcels of federal land that could be sold without significantly affecting the resource base or public service. The Hector Land Use Area was one parcel studied for possible disposal under the "Assets Management" program. When public meetings were convened to evaluate this idea, there was strong local support for continued federal ownership. Local and regional citizens had come to depend on Hector for wood products, forage, recreation and other benefits. Because of this public support, Congress enacted legislation to make it a permanent part of the National Forest System. In October of 1985, the Hector District of the Finger Lakes National Forest was established (USDA 2000).

Aquatic Resources

The FLNF lies astride a plateau known as the "Hector Backbone." About half of the land drains to the east toward Cayuga Lake and half to the west toward Seneca Lake. These are the two largest Finger Lakes, each being about 40 miles long and two to three miles wide.

The FLNF land lies within three watersheds (Taughannock Creek, Trumansburg Creek, and Cayuga Lake) that drain into Cayuga Lake and one watershed (Seneca Lake) that drains into Seneca Lake. The FLNF contains six perennial and many intermittent and/or ephemeral streams and approximately 134 mapped wetlands that include approximately 226 acres (National Wetlands Inventory). Wetlands range in size from less than 0.1 acre to 21 acres, average almost 2 acres in size. There are no natural bodies of water, but 46 livestock ponds have been

constructed on grazing pastures and 27 wildlife ponds have been built throughout the remainder of the Forest. These ponds average one-half to one acre in size (USDA 2004c).

The only public water supplies on the FLNF are drilled wells with hand pumps at Blueberry Patch Campground and Potomac Group Campground. Each well is about 100 feet deep. One spring, located off Picnic Area Road, is under special use permit to supply a residence (USDA 2000).

The primary fish habitats on the FLNF are found in the small human-made wildlife ponds and the few perennial streams scattered across the Forest. The ponds support limited natural reproduction of warm water fish species and a recreational fishery (FLNF pond surveys 1989-2004). Ponds are stocked with warm-water species (e.g. Largemouth bass, Bluegill, Golden shiner), as well as rainbow trout and brook trout in Ballard, Foster, and Potomac ponds. Ponds that have become shallow and choked with excessive vegetation have been dredged to restore fish habitat, and grass carp has been introduced in a few ponds to reduce aquatic vegetation growth. Stream fisheries are maintained solely through natural reproduction, and populations of native fish there appear healthy and stable.

Terrestrial Resources

The FLNF is underlain by geologic formations that represent important reservoirs of natural gas in the Northeast, which have been in production since the 1880s. The Forest sits astride an important fracture zone of this formation, and a significant amount of natural gas production and leasing is occurring in the areas surrounding the Forest (Romito 2004).

The FLNF is dominated by soils formed from upland glacial till plains, generally with slopes of less than 25 percent (Tetra Tech 2003). Tills vary from acidic in the southern portion of the Forest to more basic and fertile in the northern portion of the Forest. Along the Hector Backbone, soils are relatively shallow to bedrock (DeGloria 1998). There are small areas in ravines and along the few perennial streams on the Forest where areas of sediment have been deposited by water movement (DeGloria et. al. 1999). During the agricultural period of European settlement, soils were severely depleted by land use practices, and are currently recovering (DeGloria 1998).

Vegetation on the FLNF can be grouped into five major types: mesic hardwood forests of maple, beech, ash and basswood, as well as aspen and locust; Appalachian oak-hickory forests of oaks, hickories, and pines; softwood forests of native hemlock and pine as well as plantations; shrublands of trees, shrubs, and forbs; and grasslands. Grasslands are maintained for grazing and for wildlife use, and shrublands are maintained for wildlife use. Forested conditions are found on 55 percent of the FLNF, split more or less evenly among the forest types. Most forested land is currently available for management using timber harvesting, and most is less than 100 years old due to land use history in the area. There are no known areas of old growth. Prior to European settlement, the FLNF was about one-third oak-hickory forest and two-thirds mesic hardwood forest, with small percentages of native softwoods and black ash swamp. The Hector Backbone was particularly noted for brushy, scrubby conditions of oaks and beech, and evidence of fire disturbance, during the 1790s (Marks and Gardescu 1992).

About 200 vertebrate species and over 300 vascular plant species inhabit the FLNF (USDA 2000). No federally-listed Threatened or Endangered species, species proposed for federal listing, or critical habitat for such species, have been found on the FLNF (USFWS 2004). Species of viability concern that may be rare or declining on the FLNF or in the region include 25 animals and 16 plants. The FLNF provides a diversity of habitats for animal and plant species. Habitats that are of particular importance to species in this area include grasslands, shrublands, young deciduous trees, upland forest, old forest conditions, shale cliffs and ravines, wetlands, riparian areas, and aquatic habitats (USDA 2004b). All of these habitats, except old-forest conditions, can be found currently on the FLNF.

Management Direction

Goals and Objectives

Goals and objectives for management of the FLNF are presented in Chapter 2, Section 2, of the revised Forest Plan. Projects are undertaken across various management areas in order to meet resource specific goals and objectives. The Forest is valued for its diverse habitats and biodiversity, wood, forage, and other products, the multiple services available on the National Forest System lands, and the Forest Service commitment to preserve long-term productivity. For these reasons, the Forest Service is strongly committed to the continuation of multiple

use management, and the sustainability of the many natural resources of the FLNF. Management goals include providing for clean water, air, productive soils, and a diversity of plant and animal life. The Forest is committed to promoting an awareness of natural resource management and a strong conservation ethic to highlight the FLNF dedication to careful stewardship of the land for present and future generations.

Goals and objectives that are relevant to TES species are primarily associated with Goal 2, which requires the Forest to maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals. Objectives under this goal include those for habitat composition, age-classes, and habitat features important to wildlife, similar to those in the current Plan. Other objectives for this goal include those that require the Forest to work toward recovery of federally-listed threatened or endangered species; maintain or enhance habitats for sensitive species; cooperate with New York on inventory of rare, unique, or exemplary biological features; maintain fish populations through habitat work, and minimize the effects of non-native invasive species (NNIS) that can compete with and overcome native species. Goals 3 – 7 and associated objectives provide direction for maintaining and restoring terrestrial and aquatic ecological systems and habitats, which support the viability of species associated with those habitats.

Standards and Guidelines

Standards and guidelines for each resource are described in Chapter 2, section 3, of the revised Forest Plan. Management activities that take place on the FLNF are guided by federal laws, regulations, and departmental and agency policy found in the agencies manuals and handbooks. Of particular relevance to TES species are the Endangered Species Act and the National Forest Management Act, and their associated regulations and policies. The Forest Plan standards and guidelines supplement this direction by recognizing resource conditions on the FLNF and considering state regulations in New York. Forest Plan standards and guidelines can be stricter than laws, regulations, and agency policy, but cannot be more lenient. Due to the abundant management direction found in these laws, regulations, and policies for TES species, and the few TES species known to occur on the FLNF, few standards and guidelines are currently needed for additional species conservation. A new standard requires the Forest to maintain a regularly updated list of threatened, endangered, and sensitive (TES) species and make it readily available to the public. Two standards specific to protection of nesting sites of northern goshawk from disruptive management and recreational activities have been added.

Standards and guidelines and additional management direction for other resource areas can also influence TES species and their habitats. This direction is summarized below.

Water Resources Management

Management of water resources consists primarily of dredging wildlife and stock ponds periodically, some limited habitat management for fish, and using erosion control measures and fencing to improve water quality. The revised Plan continues the 1987 Plan direction to protect the integrity of water resources and life-supporting functions. It also clarifies that maintaining or improving water quality includes the protection and restoration (e.g. buffer strips, fencing) of riparian areas, and associated ecological process and functions such as filtering sediments and providing woody debris for habitat creation. The revised Plan makes water resource standards and guidelines align with best management practices (BMPs) in New York State, and monitoring of streams and ponds is emphasized.

Forest Resources Management

Silvicultural methods are applied in stands to produce the desired future condition and levels of outputs envisioned by the revised Forest Plan for a management area. Both even-aged and uneven-aged management systems are considered, with the ultimate selection of a specific treatment based upon the desired future condition for the management area and the resource conditions that exist within the stand.

Even-aged silviculture

Even-aged silvicultural techniques are used where long-term objectives are to manage for trees that are relatively close in age (within twenty years), for an established length of time (rotation age), with the eventual intention to establish a new stand of seedling regeneration to replace the trees currently in place. This type of management can be accomplished by applying a series of treatments throughout the life of the stand, some of which take place during the initial phases of stand development (regeneration treatments, pre-commercial thinnings), some during the mid-life of a stand (intermediate thinnings, timber stand improvements) and some nearing the rotation age for the stand (reforestation treatments to establish seedlings, regeneration harvests such as shelterwoods or clearcuts). This system is most often used to regenerate tree species that require moderate to high amounts of

light to regenerate. For the most part, seedlings are produced through natural regeneration processes. Sometimes, artificial regeneration (planting) is used when seed source is lacking or seedlings fail to develop. Repeating even-aged treatments across the landscape results in a multi-aged forest composed of even-aged stands. The following describes the various treatments in an even-aged silvicultural system.

1. Intermediate thinnings - The objective of this treatment is to maximize volume yield by removing lower quality trees and by salvaging trees that would otherwise die; to concentrate growth on the better trees; and to improve conditions for residual trees. This is accomplished by reducing the number of trees in stands that are above 80 percent relative density (which equates to canopy closures above 71 percent) to approximately 60 percent relative density (54 percent canopy closure). Most thinnings occur in stands that are over 90 percent relative density (79 percent canopy closure). Trees to be removed are concentrated in the smaller diameter classes, leaving the larger, healthier trees on site. More open canopy conditions may persist for 15-20 years following the thinning.

2. Shelterwood system - The objective of this treatment is to establish seedling regeneration through the application of 1 or 2 preparation or seed cuts, followed by the almost complete removal of overstory trees in a removal harvest. Relative density is reduced from above 80 percent to 30 - 40 percent in the shelterwood seed cut. A reduced forest canopy permits greater amounts of sunlight to reach the forest floor and seedling growth is stimulated. It may take from 3-10 years for adequate seedlings to germinate and become established. Once adequate numbers of seedlings are in place, a shelterwood removal can be completed to permit the seedlings to grow in full sunlight.

   Where appropriate, residual stems of mast trees (such as American beech) and softwood trees (such as eastern hemlock) are retained for wildlife purposes. In all stands, Forest Plan standards and guidelines require that at least 4 den, nest, and snag trees (combined) be retained per acre during these management activities.

3. Shelterwood with Reserves system - The objective of this treatment is to establish seedling regeneration of shade tolerant species (sugar maple, American beech, red maple) in areas where the second cut of a standard shelterwood is delayed for 40 to 60 years. Relative density is reduced from above 80 percent to 30 percent or 40 percent in the first cut (seed cut) of the shelterwood. The increased amount of sunlight reaches the forest floor and seedling growth is stimulated. Trees that need high levels of sunlight (yellow birch, white ash, black cherry) do not regenerate as well in a shelterwood with reserves system when compared to a standard shelterwood system of regeneration cutting.

   Where appropriate, residual stems of mast trees (such as American beech) and softwood trees (such as eastern hemlock) are retained for wildlife purposes. In all stands, Forest Plan standards and guidelines require that at least 4 den, nest, and snag trees (combined) be retained per acre following the removal cut.

4. Clearcut - The objective of this treatment is to remove trees in stands where adequate numbers of seedlings exist in the understory, or to remove trees by cutting the existing stand which allows seedling regeneration to develop after the cut occurs. On the FLNF, this treatment is currently used primarily to regenerate aspen, which regenerates vegetatively from its root system.

   In all clearcut stands, Forest Plan standards and guidelines require that at least 4 den, nest, and snag trees (combined) be retained per acre following the clearcut.

During the time period of 1987 through 2001, the FLNF harvested timber on approximately 490 acres, averaging approximately 30 acres of harvest per year (USDA 2002). Of the total amount of harvest that occurred during this time period, harvesting using clearcutting and shelterwood harvests accounted for approximately 430 acres or 87% of the total harvested acres. Of the acres harvested using these methods, approximately 54 acres or 11% were harvested using the clearcut method. This primarily occurred on upland landforms to maintain aspen and locust stands and to convert non-native softwood plantations to native hardwoods. This clearcut acreage represents less than one percent of the forested lands on the FLNF. The shelterwood with reserves system has been used in a very limited way on the FLNF, representing a very small percentage of the almost 200 acres managed using the shelterwood method. Approximately 37% of the total harvest was thinning, and this method was used primarily to salvage individual trees, release oak mast trees and accelerate growth of individual trees within the stand.

Uneven-aged silviculture
The revised Plan sets an objective to apply uneven-age silvicultural systems to 5-15% of lands managed for timber. Uneven-aged silvicultural techniques are used where long-term management objectives are to maintain continuous forest cover with a variety of age and size classes present within the same stand. Management activities occur periodically (approximately 20 years apart) with each entry intended to establish some seedling regeneration. The objective for selecting an uneven-age treatment may vary, but often it is related to visual, recreational or site (wetness) concerns. It is most often used to regenerate tree species that require moderate to high levels of shade to become established. The factors considered in the application of an uneven-aged harvest are the same as those considered in even-aged - stand density, stand structure and species composition - however the type of structure and composition are quite different than those sought under even-aged treatments. Three types of uneven-aged treatments are used.

1. Improvement Cut - The objective of this treatment is to modify the age and size class distribution of an even-aged stand to that of an uneven-aged stand by removing designated trees through commercial harvest. By reducing the overstory to 60 percent of full stocking, and concentrating these removals in specific age and size classes, residual stand structure will become more like that of an uneven-aged stand. Some seedling regeneration may become established in this kind of harvest; however more emphasis would be placed on seedling establishment in subsequent entries.

2. Individual Tree Selection - The objective of this treatment is to maximize volume yield by removing lower quality trees and by salvaging trees that would otherwise die; to concentrate growth on the better trees; and to open the canopy enough to foster the development of a new age class after every cut. This is accomplished by reducing the number of trees in stands that are above 80 percent relative density (which equates to canopy closures above 71 percent) to approximately 60 percent relative density (54 percent canopy closure). Most selection harvests occur in stands that are over 90 percent relative density (79 percent canopy closure).

3. Group Selection - This treatment is similar to individual tree selection, but varies by the removal of small clumps of trees (usually less than 0.25-0.5 acre in size) in conjunction with removals similar to the individual tree selection. Post-harvest density will average slightly lower than in individual tree selection to as low as 50 percent relative density (45 percent canopy closure).

During the time period of 1987 through 2001, uneven-aged silviculture was used on 62 acres or 13% of the total acres harvested on the Forest (USDA 2002). This method was used primarily in highly sensitive visual areas such as roadsides, trail and recreation sites. It was also used in riparian areas to maintain shade along streams.

Reforestation
Reforestation techniques are included in both even-aged and uneven-aged regeneration systems. The goal of any regeneration harvest is to establish a new age class of seedlings to replace trees being removed. The primary difference between even-aged and uneven-aged treatments is that in even-aged management, the entire stand is regenerated at once, within a relatively short period of time and results in a stand composed of trees of the same age. Uneven-aged treatments are intended to produce fewer numbers of seedlings in every entry and results in a stand composed of trees that vary in age, with continual replacement of trees over time. The same reforestation treatments (site preparation) can be effective in both even-aged and uneven-aged systems.

Seedling regeneration on the FLNF is generally not a problem. Seedlings, shrubs and smaller trees are generally present in most stands or readily regenerate naturally. Understory vegetation is sometimes dominated by brush, beech, and striped maple. Seedling development of a greater diversity of desirable species can sometimes be achieved more effectively by completing reforestation treatments such as removal of competing vegetation (beech and striped maple) or by providing optimal light conditions through removal of shade with a regeneration harvest such as a shelterwood seed cut, or an individual or group selection harvest.

Special Forest Products
The FLNF currently issues permits for collection of three products, including saplings, dead/down wood, and firewood. These products are gathered for personal use; no permits for commercial gathering have been issued over the last 15 years. Under Forest Service policy, permits are generally not required for gathering of minor amounts of products (known as incidental use), such as cones, mushrooms, berries, acorns, or nuts, as long as these products are intended for personal use, and as long as they can be harvested sustainably. Permits are required for products that are gathered in larger amounts, involve improvements on the ground, are intended for

sale by the gatherer, have value that can be appraised and recovered by the Government, are in limited supply, or otherwise require controls on use in order to maintain viability of species or sustainability of gathering. Over the past four years, only permits for firewood have been issued, ranging from nine permits in 2001 to 14 permits in 2004, with a slight increase in permit numbers over that time. Firewood gathering, which is restricted to dead and down wood, has averaged about 24 cords per year.

Gathering of special forest products that require a permit, whether for commercial or personal use, is prohibited in Future Old Forest, RNA/cRNA, and Ecological Special Area management areas. Limited exceptions are allowed for gathering by permit for research purposes in RNAs/cRNAs. Recreation/Education Special Areas and the North Country Scenic Trail restrict special forest product gathering to non-commercial activities, or incidental and personal use permit gathering.

Wildlife Habitat and Rangeland Management

Wildlife habitat management strategy on the Forest through the revised Plan is to provide a diversity of vegetation types and structures. Each alternative approaches the proportions of types and structure a little differently, although all maintain or improve on the current diversity of habitats on the Forest. One tool for management of wildlife habitat involves vegetative manipulation, and the levels and types of manipulation also vary by alternative. To manage habitats on the FLNF, three techniques are normally utilized: 1) timber sales in mature forest communities; 2) livestock grazing in grass/forb communities; and 3) a combination of burning and cutting in un-grazed grassland and shrubland communities. Livestock management within the grazed lands involves management of stock ponds and animals as well as vegetation. Stock ponds and riparian areas are fenced to protect water quality. Utilization and management of the vegetation is regulated so that the pastures remain productive with desired forage species, and so that grassland birds that nest in these areas are protected. Additional wildlife projects included such things as enhancement of cavity nesting habitat through the placement of nest boxes.

Objectives are included in the revised Plan that emphasize control of NNIS. The revised Plan incorporates NNIS into goals and objectives for ecosystem management, education, and relationships with partners and community organizations. The revised Plan includes Forest-wide standards and guidelines that direct the Forest Service to incorporate information on the status and threat of NNIS infestation as part of project development, to use standardized methods for determining risk, and to identify measures that can be undertaken to prevent and control the spread of NNIS during project implementation. Standards and guidelines also provide guidance regarding infestation treatment; require inclusion of NNIS prevention methods in contracts and permits; provide direction regarding seed mixes and mulch; and outline an integrated pest management approach that includes methods of prioritizing prevention and control activities.

Roads Management

Public roads were established at one square mile intervals, running north and south, and east and west. Deeds to the federal lands include outstanding right-of-ways to local towns and counties for road purposes. As a result, the Forest Service does not have jurisdiction on most roads that cross the Forest. Some of the original public roads have been abandoned because they were not necessary to manage the land. No new roads are needed. Most roads are graveled and of adequate width to permit vehicles to pass. The most heavily traveled roads on the Forest are Potomac Road, Picnic Area Road and the Burnt Hill Road.

The revised Forest Plan will continue the management direction for transportation systems provided in the 1987 Plan. The revised Plan objectives emphasize using design elements and standards to maximize economy, while meeting management direction for resource and environmental protection, and user safety. This will be accomplished by constructing or reconstructing roads to accepted federal and State standards. There have been only minor enhancements to forest-wide standards and guidelines for the FLNF transportation system. Standards still mandate the use of Forest Service manual direction and AASHTO Policy for road design. Some additional standards regarding drainage structures, stream crossings, and in-stream structures will clarify mitigation for free movement of aquatic life and fish. There is also further clarification on year-round or seasonal road restrictions.

Recreation Management

The FLNF is crisscrossed by a dense network of roads and trails and intermingled with private homes and farms. This provides a roaded, but natural appearing setting for public recreation. No large, remote land areas exist which could provide opportunities for primitive recreation. Primary recreation attractions include developed camping and picnic areas, trails for hiking, horseback riding, cross-country skiing and snowmobiling, wildlife

ponds, and opportunities to hunt and fish. About one third of the use the Forest receives occurs at developed sites, while the remainder occurs as dispersed use throughout the Forest. Recreation facilities include:

- 6 developed sites, including 3 campgrounds, 1 trail shelter, and 2 fishing sites
- 38 miles of trails, including 17 miles for horseback riding, 15 miles for cross-country skiing, 14 miles for snowmobiling, and 7 for mountain biking; all are open to hiking.

The revised Forest Plan provides a single goal for recreation to provide a diverse range of high quality, sustainable recreation opportunities that complement those provided off National Forest System lands. The objectives focus on reducing recreation facility deferred maintenance and operating to quality standards, promoting partnerships for efficient management and enhanced public services, and completing site specific management plans for a high quality, sustainable recreation program.

In the revised Forest Plan there are two management areas (MAs) that specifically emphasize recreation opportunities: Recreation and Education Special Area and North Country Scenic Trail Special Area. The Recreation and Education Special Area includes Caywood Point and the North Country Scenic Trail Special Area includes a corridor surrounding the trail. The Interloken Trail and Ravine Trail will not be individual MAs and will be managed under the forest-wide standards and guidelines. Future trail development, developed recreation facilities, and recreation special uses are limited or prohibited in some management areas to complement desired future conditions, particularly in Future Old Forest, RNA/cRNA, and Ecological Special Area MAs. Due to the roaded nature of the Forest, existing snowmobile uses within Future Old Forest will be allowed, although no new motorized trails will be developed in those areas. Ecological Special Areas and RNAs/cRNAs do not allow motorized uses. Horseback riding and mountain bike use will only be allowed on designated trails and pastures. Summer off-highway vehicles will continue to be prohibited across the Forest with no opportunities for future summer OHV trail development. A trails assessment identified three new proposed trails, the Burnt Hill Alternative (3.3 miles), Horse Camp Connector (.25 miles) and Pearsall Loop Trail (5.6 miles). All three trails are proposed for multiple-uses and will be more accurately located on the ground following site specific analysis.

Wildland Fire Management

Few wildfires occur on the FLNF, although at the time of settlement in the late 1700s there was strong evidence of fire along the Seneca Lake edge of the Forest and the Backbone, likely related to activities of native peoples. For most of the rest of the Forest, the amount of snow and rain and the type of vegetation make it difficult for fires to get started. When fires do occur, they typically affect only small areas. Vegetation burns slowly, allowing fires to be detected and suppressed quickly.

Prescribed fire is utilized to maintain the open characteristics of the Forest's shrubland and grassland by burning woody vegetation and thereby preventing natural succession to forest. Prescribed fire has been historically utilized during the spring of each year, before vegetative "green-up" and before a majority of the wildlife species have produced offspring. The revised Plan continues the direction of 1987 Plan related to fire management on the FLNF. The revised Plan places greater emphasis on reducing hazardous fuels with the addition of a goal to maintain or restore ecological processes. This goal has two associated objectives related to fire management: to manage the oak-pine natural communities and reduce hazard fuels where needed to reduce threats to private property, habitats, or ecosystem components. The revised Plan does not allow wildland fire on the Forest. Wildland fire allows a natural fire to burn as long as where it is burning has a plan for managing the fire. The Forest is too small at this point to justify the expense of developing such plans given the low frequency of natural ignitions of fire. Forest-wide standards and guidelines were rewritten to focus on using and/or suppressing fires based on plans and updated smoke management practices. A guideline was also added to consider fire effects on dead wood that provides wildlife habitat.

Energy Production, Communications, and Minerals Management

The Forest Service can authorize the use of federal lands for non-recreational special uses, including uses related to energy production and transmission, communications, and minerals. Revised Plan direction requires such developments to be placed where consistent with management area direction, and each proposal will require an environmental analysis. No wind or water developments exist in the FLNF area. However, because of its topography and exposure, the area might provide good potential for wind energy generation. Although no

proposals for wind power development have been received, management areas vary in terms of where wind power development may be allowed.

Since the 1950s, technological changes have increased pressure for communication sites on high land in the FLNF. The Burnt Hill communication site was in use prior to completion of the 1987 Forest Plan and Forest Service policy regarding electronic site designation. In recognition of historical use, Burnt Hill is a designated electronic site. Two government agencies have been authorized to use the Burnt Hill electronic site, and Forest Service radio equipment is there as well. The other authorizations include utility lines providing electricity and telephone service to residents living on private land within or near the Forest.

Much of the FLNF was leased for oil and gas production during the mid-1970s. No drilling occurred on the FLNF at that time, and those leases expired in the mid-1980s. Interest in natural gas production from the Finger Lakes Region was renewed in the late 1990s due to recent drilling that indicated there was good potential for deep gas under the Forest. In response to an industry proposal in 1998 to lease the entire Forest for oil and gas development, the Forest issued a Record of Decision in which they chose a "No Action" alternative to the leasing proposal. If new information becomes available that would prompt a new proposal then additional analysis would occur at that time. New information would include a change in public attitude toward the need to access the natural gas under the Finger Lakes National Forest.

Unlike the 1987 Forest Plan, the revised Plan will not have a specific goal with objectives for minerals, including oil and gas. The revised Plan has Forest-wide standards and guidelines for minerals. Management area standards and guidelines exclude certain portions of the Forest from mineral–related surface disturbance, including Ecological Special Areas, RNAs/cRNAs, and Future Old Forest. Rangelands are available for surface occupancy related to oil and gas development under the revised Plan.

Management Areas

The revised Plan divides the Forest into 10 management areas. Each management area has a particular emphasis, a desired future condition of the lands within that management area, and a set of standards and guidelines under which activities are undertaken to achieve the desired future condition. All Forest-wide standards and guidelines apply to each management area, unless further constrained by those written for each specific management area. A description of desired future conditions and associated management for each management area can be found in Chapter 3 of the revised Plan. The following is a summary of groupings of management areas on the Forest.

Grassland and Shrubland Emphasis

There are three management areas that emphasize grassland/shrubland. These include Grassland for Wildlife, Grassland for Grazing, and Shrubland. The two grassland management areas emphasize production of grass/forb vegetation, which represent an important wildlife habitat for nesting and foraging. Wildlife grassland is maintained primarily by mowing and prescribed burning; vegetation in the grazing lands is maintained primarily by the grazing itself. Shrubland vegetation includes grasses and forbs but emphasizes shrubby, thicket-like vegetation that is intermediate between open lands and forested lands.

The desired future condition is continuation of open grassland, pasture, or shrub vegetation and the wildlife that inhabit these habitats, as well as livestock on the grazing land. Management guidance tends to restrict uses that potentially interfere with wildlife nesting and brood rearing. Recreation opportunities emphasize dispersed activities such as hiking, hunting, fishing, bird watching, and nature study. Trails for different uses will also be designated in this area. Management for TES and for non-native invasive species is allowed in these management areas.

Northern Hardwood Forest Emphasis

This management area emphasizes shade-tolerant northern hardwood tree species, including the production of high-quality sawtimber and other timber products on a sustained basis. The desired future condition is a continuous forest canopy with a mixture of tree sizes and ages ranging from seedlings to very large, old trees. Management guidance tends toward uneven-age silviculture practices, including single tree and group selection, that maintain shade-tolerant northern hardwood species in visually pleasing stands and encourages a wide range of recreation opportunities compatible with Roaded Natural ROS class, including developed recreation sites and camping areas. Management for TES and non-native invasive species is allowed in this management area.

Oak Forest Emphasis

This management area emphasizes oak/hickory forests, including production of high-quality sawtimber and other timber products on a sustained basis. The desired future condition is a mix of oak, hickory, white pine, and other deciduous and coniferous stands that vary in size, shape, height, and tree species. Both even-age and uneven-age stands will occur in this MA. Management guidance encourages a wide range of silvicultural practices, including even-aged and uneven-aged silvicultural systems, as well as a full spectrum of recreation opportunities compatible with Roaded Natural ROS class, including developed recreation sites and camping areas. Management for TES and non-native invasive species is allowed in this management area.

Future Old Forest Emphasis

This management area emphasizes natural succession of plant communities to old forest conditions, with little or no timber harvest. The desired future condition is a variety of ecological land types and natural communities where terrestrial and aquatic ecosystems develop under natural disturbance regimes. Forests of oak, northern hardwoods, and hemlock will dominate. Management guidance tends to restrict management activities and recreational uses that emphasize human presence on the landscape or threaten the integrity of the Semi-primitive ROS class. Management guidance encourages uses that help restore or maintain natural processes, natural communities, and associated species within their natural ranges of variation in the landscape. Management for TES and non-native invasive species is allowed in this management area.

Special Management Emphasis

There are four management areas that have a special management emphasis. These include the North Country Scenic Trail, Ecological Special Areas, Recreational and Educational Special Areas, and Research Natural Areas/candidate Research Natural Areas. These management areas emphasize preservation and protection of the nationally significant North Country Trail; protection of areas with uncommon, significant, or outstanding recreational, scenic, cultural, biological, ecological, geological, or historical values, and protection of representative or unique ecosystems for research. The desired future condition for these areas will exemplify the special values for which each is identified. Natural disturbance regimes and occasional management activities will shape the vegetation composition, which will include a wide variety of vegetation types, including conifer and locust plantations, managed hardwood forest, old growth forest, shrubland, wildlife ponds, as well as evidence of historic farming activities, such as stone foundations and stone walls. In general, Research Natural Areas and candidate Research Natural Areas will exhibit less evidence of recent or historic past human disturbance than the other special management areas. Management guidance tends to restrict uses that threaten the integrity of these special areas and encourage uses that promote protection of the unique, uncommon, or significant features. Management for TES species is allowed in these management areas. Management for non-native invasive species is allowed in these management areas but may be restricted.

Chapter 3 - Analysis of Effects, Federally-listed Species

Conservation Status Ranks

Conservation status ranks identify a species status at several scales (NYNHP 2003, NatureServe 2004a, b). The status of a species or community is designated by a number from 1 to 5, preceded by a letter denoting the appropriate geographic scale: G for global, N for national, and S for sub-national (state or province). The numbers have the following meaning:

1. critically imperiled,
2. imperiled,
3. vulnerable to extirpation or extinction,
4. apparently secure, and
5. demonstrably widespread, abundant, and secure.

For example, "G1" would indicate that a species is critically imperiled across its entire range (i.e., globally). A rank of "S3" would indicate the species is vulnerable and at moderate risk within a particular state or province, even though it may be more secure elsewhere. "SX" indicates that a species is presumed extirpated from a state or province; "SH" indicates that records are historical, implying possible extirpation. Rankings like "S2S3" imply a small degree of uncertainty, whereas "SU" or "S?" denoted a high level of uncertainty. "SNR" means unranked. Qualifiers "B," "N," or "M" indicate the status of breeding, non-breeding, and migrant populations. For example, "S2B,S4N" denotes status of "S2" for the species during the breeding season and status of "S4" during the non-breeding season. "T" identifies a particular subspecies; "G5TH" for the eastern cougar identifies a critically-imperiled subspecies of an otherwise widespread and common species.

Summary of Species Determinations

This Biological Evaluation has determined that the revised Forest Plan and its alternatives will have **No Effect** on the following species:

- Gray wolf (*Canis lupus*)
- Eastern cougar (*Felis concolor cougar*)
- Canada lynx (*Lynx canadensis*)
- Bald eagle (*Haliaeetus leucocephalus*)
- Bog turtle (*Clemmys muhlenbergii)*
- Leedy's roseroot (*Sedum integrifolium* ssp. *leedyi*)

The Biological Evaluation has also concluded that the revised Forest Plan and its alternatives **May Affect** but are **Not Likely to Adversely Affect** the following species:

- Indiana bat *(Myotis sodalis)* – (possibility of cutting roost trees)

These conclusions are consistent with a consultation held with the USFWS in 2000 regarding continued implementation of the 1987 Forest Plan, and potential effects that it might have on endangered, threatened, and proposed species. The FWS (USFWS 2000) concluded that Indiana bats may be present in the FLNF, but at extremely low density. Consequently, the potential for adverse impacts was extremely unlikely and discountable, and implementation of the Plan was not likely to adversely affect the Indiana bat. In the same opinion, the FWS concurred that implementation of the Plan should have no effect on the gray wolf, eastern cougar, bald eagle, bog turtle, and Leedy's roseroot.

Effects Common to All Alternatives

All alternatives promote the protection, enhancement, or maintenance of federally-listed species and the habitats on which these species depend. Laws, regulations, and agency policy all require the Forest Service to maintain viable populations of these species, or to assist in their recovery. While the role that the FLNF plays in contributing to the conservation of these species varies by alternative (for example, by providing differing amounts and quality of suitable habitat conditions), all alternatives were developed with the premise that the FLNF will maintain or contribute to the viability and/or recovery of these species, in cooperation with the USFWS.

Gray wolf

Information presented here on this species is derived from a review of the literature, which is documented in the Forest Plan revision project file referenced in the Bibliography (USFS 2003k, SVE Mammal Panel 2003).

The legal status of the gray wolf in the United States, and the specific taxa to which various degrees of protection have been afforded, have changed several times since the species was first designated as endangered in 1967 (32 FR 4001). The Minnesota population was reclassified as threatened in 1978 (43 FR 9612, USFWS 1992). In 2003, the USFWS established three distinct population segments (DPS) for wolves in the United States: the Western DPS (Washington, Oregon, California, Nevada, Idaho, Montana, Wyoming, northern Utah, and northern Colorado), the Southwestern DPS (Arizona, New Mexico, western Texas and Oklahoma, and southern Utah, and southern Colorado), and the Eastern DPS (North and South Dakota, Nebraska, Kansas, Missouri, Iowa, Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania, New York, and New England). A separate DPS for the northeast was considered, but with no firm evidence of an extant wolf population, the region was included in the Eastern DPS. The Eastern DPS is classified as threatened (68 FR 15804). In New York State the gray wolf is endangered and extirpated (NYDEC 2004b).

Distribution, Status, and Trend

Gray wolves were historically distributed throughout the northern hemisphere north of 20°N latitude in all habitats and topography except deserts and high mountain tops (Mech 1974). By 1900, the species was extirpated from more than 95 percent of its historic range in the conterminous United States, including New York and New England. In Maine, two animals believed to be wolves were found during the mid-1990s, but no additional confirmed occurrences of wolves in the Northeast are known (65 FR 43449). The closest known populations occur in southeastern Quebec (Harrison and Chapin 1998), Algonquin Provincial Park, Ontario (Theberge et al. 1996), and the north-central United States (USFWS 1992).

Wolves that most recently inhabited the northeastern United States have been considered unique among North American wolves; however, it is unclear if northeastern wolves were a subspecies (*C. lupus lycaon*) or a separate species (*C. lycaon*) (Wilson et al. 2000). Hybridization with coyotes (*Canis latrans*) in the northeast has further complicated taxonomy issues. Also unclear is whether wolves that occurred in the northeast before European settlers arrived were the same taxon as wolves currently in or within dispersal distance of the region.

The gray wolf is ranked by NatureServe (2004b) as G4 globally and N4 in both Canada and the United States. It is considered extirpated in New York State (NatureServe 2004b, NYDEC 2004b). Given current habitat and human population/land-use conditions in the Finger Lakes Region, it is unlikely that the gray wolf will reestablish itself on the FLNF in the foreseeable future (SVE Mammal Panel 2003).

Life History and Habitat Relationships

Detailed information on the life history and ecology of the gray wolf is contained in Mech (1974), USFWS (1992), and Paquet and Carbyn (2003).

Habitat requirements and prey relationships likely have the greatest influence on the potential existence of gray wolves in a particular region. Habitat requirements of the gray wolf relate more to habitat conditions available for their prey species, ungulate biomass, and low human density than any particular forest cover type or vegetation structure (Carbyn 1987, DeGraaf and Yamasaki 2001). Even if white-tailed deer (*Odocoileus virginianus*) could provide a suitable prey base for wolves in the Finger Lakes region, the limited scale of potential habitat and the

level of human development would be incompatible with their viability. Viable wolf populations require either 10,000 square miles (approximately 6 million acres) of contiguous, suitable habitat if the population was isolated or 5,000 square miles (approximately 3 million acres) of such habitat if the population was within 100 miles of a self-sustaining wolf population (USFWS 1992). Potential dispersal habitat in the northeastern United States would include either forested or mixed forest-cropland cover types with fewer than 16 humans and less than 1.1 miles of roads per square mile (Fuller et al. 1992, Harrison and Chapin 1998). Estimates for core habitat requirements are more rigid, ranging from 2.5 to 6.5 humans and including less than 0.72 miles of roads per square mile of forested habitat (Harrison and Chapin 1998, Mladenoff and Sickley 1998).

Limiting Factors and Threats
It is not clear that a wolf population could survive in New York given the abundance of highways and our large human population. Nor is it clear that having wolves in the woods of northern New York would be compatible with the interests of residents or the farmers that live on the periphery of that region.

Information Gaps
Given that gray wolves do not exist currently on the FLNF and are not likely to occur on the Forest in the near future, the SVE Mammal Panel (2003) did not identify any information gaps relative to this species and the FLNF Plan revision process.

Management Direction Pertinent to Gray Wolf
The Forest Plan makes no specific provisions for management of the gray wolf.

Potential Management Effects
Because of the complete absence on the FLNF, and the questionable suitability of habitats on the FLNF, implementation of the revised Forest Plan can have no direct, indirect, or cumulative affect on gray wolves.

Determination and Rationale
Because this species is not known to occupy the FLNF, implementation of the revised Forest Plan, as proposed will have ***No Effect*** on the gray wolf.

This conclusion is consistent with a consultation held with the USFWS in 2000 regarding continued implementation of the 1987 Forest Plan, and potential effects it might have on endangered, threatened, and proposed species. The FWS (USFWS 2000) concluded that implementation of the 1987 Plan should have ***No Effect*** on the gray wolf.

Eastern Cougar

Information presented here on this species is derived from a review of the literature, which is documented in the Forest Plan revision project file referenced in the Bibliography (USFS 2003l, SVE Mammal Panel 2003).

The USFWS listed the eastern cougar as endangered in 1973 (38 FR 14678). A recovery plan was completed in 1982 (USFWS 1982). New York State (NYDEC 2004b) lists the cougar as endangered and extirpated.

Distribution, Status, and Trend
The eastern cougar (*Puma concolor cougar*) is the currently recognized subspecies that was originally known from northeast North America and is now listed as Federally Endangered (USFWS 1982). It is thought to have occurred across the Canadian provinces from Nova Scotia to Ontario and southward through the northeastern United States to South Carolina, Tennessee, Kentucky, and Indiana (USFWS 1982). The exact range is unknown because few specimens of certain origin exist. Culver et al. (2000) questioned the taxonomic validity of this subspecies and proposed that all cougars north of Nicaragua belong to the same subspecies (*P.c. cougar*). Additionally, the USFWS (1990) considered the Eastern cougar to be extinct in the northeast due to hunting by humans, habitat loss, and low deer populations in the 1800s. Thus, any cougars found in the northeast likely are transients or transplanted individuals from the west (including escaped or released captive animals), rather than representatives of some relict local population (SVE Mammal Panel 2002).

The last New England specimen of was taken in 1938 in Somerset County, Maine (Wright 1961, in DeGraaf and Yamasaki 2001). In recent years, presence of cougars has been confirmed in Vermont (Bolgiano 1995), Maine (Bolgiano 2000), and New Brunswick, Canada (Cumberland and Dempsey 1994). For these documentations, it was not possible to determine sub specific designations, nor whether the cougars were former captive animals (SVE Mammal Panel 2002).

The eastern cougar is ranked by NatureServe (2004b) as G5TH globally and NH in both Canada and the United States. It is considered extirpated from New York State (NYNHP 2003, NatureServe 2004b, NYDEC 2004b). Given current habitat and human population/land-use conditions in the Finger Lakes Region, it is unlikely that the eastern cougar will reestablish itself on the FLNF in the foreseeable future (SVE Mammal Panel 2003).

Life History and Habitat Relationships
Detailed information on the life history and ecology of the cougar is contained in USFWS (1982), Currier (1983), and Pierce and Bleich (2003).

Cougars have been reported in a wide variety of habitats in the west and it would be expected that they would occupy a similar range of diverse habitats here in the east. Suitable habitat would require sufficient vegetation to support suitable prey base (white-tailed deer) but also offer some isolation from human presence. In New England and adjacent areas, this would include remote mountain forests, swamps, and wooded watercourses (DeGraaf and Yamasaki 2001, SVE Mammal Panel 2003).

Habitat required for dispersal includes corridors that provide suitable cover for crossing into disjunct patches of habitat. Cougars avoid open areas and areas of human population (Kitchell 1999), often following watercourses in open areas to remain concealed by bank-side vegetation (Russell 1978). Specific dispersal barriers include roads and night lighting (Beier 1993, 1995). Collisions with motor vehicles are the most common cause of accidental deaths for cougars (Currier 1983, Kitchell 1999).

Limiting Factors and Threats
Loss of remote, undisturbed, and un-fragmented habitat is the greatest threat to existing cougar populations. Similarly, absence of these habitats is the greatest limiting factor affecting reoccupation in areas where cougars previously occurred. Beier (1993), using simulated population dynamics, estimated that an area of 1,000 to 2,200 km^2 (372 to 818 mi^2) (depending on the demographics of a particular population) was needed for a population of 15 to 20 adult cougars to have a very low risk of extinction (<98%) within 100 years. Smaller areas might suffice where adequate dispersal corridors allow movement among populations. Although the Finger Lakes region of New York might support a suitable prey base (white-tailed deer), it is highly unlikely that the patchwork of urban, agricultural, and forest lands offers sufficient cover or isolation from human contact.

Information Gaps
Given that eastern cougars do not exist currently on the FLNF and are not likely to occur on the Forest in the near future, the SVE Mammal Panel (2003) did not identify any information gaps relative to this species and the FLNF Plan revision process.

Management Direction Pertinent to Eastern Cougar
The proposed Forest Plan makes no specific provisions for management of the eastern cougar.

Potential Management Effects
Cougars have been extirpated from much of their former range, especially in the east. Because of the complete absence of cougars and the apparent lack of suitable habitats on the FLNF, implementation of the revised Forest Plan can have no direct, indirect, or cumulative effects on eastern cougars.

Determination and Rationale
Because this species is not known to occupy the FLNF, implementation of the revised Forest Plan, as proposed, will have ***No Effect*** on the eastern cougar.

This conclusion is consistent with a consultation held with the USFWS in 2000 regarding continued implementation of the 1987 Forest Plan, and potential effects it might have on endangered, threatened, and

proposed species. The FWS (USFWS 2000) concluded that implementation of the 1987 Plan should have ***No Effect*** on the eastern cougar.

Canada Lynx

Information presented here on this species is derived from a review of the literature, which is documented in the Forest Plan revision project file referenced in the Bibliography (USFS 2002, SVE Mammal Panel 2002).

The USFWS designated the Canada Lynx as threatened under the ESA in 14 northern states, including New York, in 2000 (65 FR 16051). The lynx is listed as endangered and extirpated in New York State (NYDEC 2004b).

Distribution, Status, and Trend
Canada lynx are at the southern end of their range in the contiguous United States. Historical lynx occurrence has been verified in 24 northern states south of Alaska (McKelvey et al. 1999), but they currently occur in no more than 6 (68 FR 40075). In the northeastern United States, its range formerly extended into northern New York, New Hampshire, and Vermont, where it was extirpated. Lynx have persisted in northwestern Maine, although they have been considered rare (Hoving et al. 2003). Habitat for lynx and snowshoe hares (*Lepus americanus*) in parts of northern New England is contiguous with habitat south of the St. Lawrence River in southeastern Quebec and western New Brunswick. Lynx should encounter little difficulty moving between southeastern Quebec and Maine, and northern New Hampshire, and northeastern Vermont because habitat is continuous and without barriers (65 FR 16052). The FLNF is disjunct to the species range.

The Canada lynx is ranked by NatureServe (2004b) as G5 globally, N5 in Canada, N4? in the United States, and SX in New York State. Given current habitat and human population/land-use conditions in the Finger Lakes Region, it is unlikely that the eastern cougar will reestablish itself on the FLNF in the foreseeable future.

Life History and Habitat Relationships
Tumlinson (1987), Ruggiero et al. (1999), and Andersen and Lovallo (2003) provide detailed information on life history and ecology of the Canada lynx in the United States and Canada. Habitat is northern forests, and other diverse forest landscapes with significant composition of early successional habitat created by logging, fire, or insect outbreak. Lynx also favors swamps, bogs, and rocky areas. Deep winter snow cover favors large pawed lynx over smaller pawed and shorter legged bobcat (*Lynx rufus*), and may limit northern expansion of bobcat. Extensive areas of contiguous suitable habitat are needed to ensure viable lynx populations; lynx probably cannot persist in small, isolated refugia of suitable habitat (Ruggiero et al. 1999).

Distribution of lynx is virtually coincident with that of snowshoe hares (Mowat et al. 1999, Aubry et al. 1999). Other species, like red squirrels (*Tamiascurius hudsonicus*) may serve as secondary prey, but hares dominate lynx' diet even when hares are scarce (Hoving 2001).

Limiting Factors and Threats
Lack of connectivity with suitable lynx habitat and viable extant populations of lynx to the north likely precludes return of this species to the Finger Lakes.

Except in areas of deep snow, lynx also may be displaced or excluded through competition with bobcats and coyotes in some areas (Ruggiero et al. 1999, Hoving 2001, SVE Mammal Panel 2002).

Human presence also is a major limiting factor. This includes disturbances in denning habitat between May and August, as well as activities that result in snow compaction on forest roads and trails that may provide lynx competitors access into lynx habitat (Ruggiero et al. 1999).

Information Gaps
Given that Canada lynx do not exist currently on the FLNF and are not likely to occur on the Forest in the near future, the SVE Mammal Panel (2002, 2003) did not identify any information gaps relative to this species and the FLNF Plan revision process.

Management Direction Pertinent to Canada Lynx
The Forest Plan makes no specific provisions for management of Canada lynx.

Potential Management Effects
Because of their complete absence on the FLNF, and the questionable suitability of habitats on the FLNF, continued implementation of the LRMP can have no direct, indirect, or cumulative affect on Canada lynx.

Determination and Rationale
Because this species is not known to occupy the FLNF, implementation of the revised Forest Plan, as proposed will have ***No Effect*** on the Canada lynx.

This conclusion is consistent with a consultation held with the USFWS in 2000 regarding continued implementation of the 1987 Forest Plan, and potential effects it might have on endangered, threatened, and proposed species. The FWS (USFWS 2000) concluded that implementation of the 1987 Plan should have ***No Effect*** on the Canada lynx.

Indiana Bat

Information presented here on this species is derived from a review of the literature, which is documented in the Forest Plan revision project file referenced in the Bibliography (USFS 2003j, SVE Mammal Panel 2002, 2003)

The Indiana bat was listed as endangered in 1967 (32 FR 4001). A recovery plan was completed in 1983 and revised in 1999 (USFWS 1983, 1999). The species is listed as endangered in New York State (NYNHP 2003, NYDEC 2004b).

Distribution, Status, and Trend
Indiana bats occur primarily in the eastern United States, from Iowa to Vermont, southward to western North Carolina and northern Alabama, and as far west as eastern Oklahoma. Unsubstantiated or isolated records exist for northern Florida, southwestern Alabama, and Michigan (Rommé et al. 1995, BCI 2004a). Distribution records are based primarily on occurrences of hibernating bats (Gardner and Cook 2002). More than half of all known Indiana bats hibernate in seven caves and one abandoned mine in Indiana, Kentucky, and Missouri (Clawson 2002).

Censuses at hibernacula suggest that Indiana bat populations decreased by 57% from 1960-2001 across their range. Southern populations, in states from Virginia and Missouri southward, declined 80% from 1960-2001. Estimated numbers also declined in Pennsylvania, but generally have increased in other northeastern states by 30% during the same time (Clawson 2002). It is unknown if local populations are increasing or if these increases are due to emigration from the south (SVE Mammal Panel 2003).

Surveys conducted since the early 1980s suggest that numbers of Indiana bats in New York are stable and may be increasing. There are eight hibernacula currently known in New York's Albany, Essex, Warren, Jefferson, Onondaga, and Ulster Counties. The FLNF is peripheral to the species' range in New York (New York Natural Heritage Program 2002) and they have not been found on the Forest. The FLNF and the surrounding region are not important to the species' overall distribution (SVE Mammal Panel 2003). No bat hibernacula are known to occur on or adjacent to the FLNF. The closest hibernaculum to the FLNF known to overwinter Indiana bats is near Jamesville, NY, approximately 60 to the northeast.

The Indiana bat is ranked as G2 globally, N2 in the United States, and S1 in New York State (NYNHP 2003, NatureServe 2004b). Currently, it is not likely that Indiana bats occur on the FLNF. Indiana bats might occur on the Forest in the next 20 years, given the continued aging of the Forest's stands and the expanding Indiana bat population in the Northeast (SVE Mammal Panel 2003).

Life History and Habitat Relationships
Detailed information on the life history and ecology of the Indiana bat is contained in Thomson (1982), USFWS (1983, 1999), the Habitat Suitability report by Rommé et al. (1995), and in Kurta and Kennedy (2002). Other general information is available from various sources, including The U.S. Fish & Wildlife Service

(endangered.fws.gov), NatureServe (www.natureserve.org), Bat Conservation International (www.batcon.org), academia, and natural resource agencies of states within the species' range.

Reproductive phenology varies with seasonal temperatures and the thermal character of the roost (Rommé et al. 1995). Young are born from late June through early July and able to fly and forage on their own at 25-37 days (Humphrey et al. 1977). From first flight through mid-August, they fly and forage with their mother (Handley 1991). Nothing in the literature indicates whether young migrate to hibernacula with their mothers or if they disperse in other directions during migration.

Some Indiana bats remain in the same general area throughout the year, migrating as little as 22 miles. Others migrate more than 300 miles between hibernacula and summer feeding and roosting areas (Hall 1962, Belwood 1998). The apparent wide dispersal of Indiana bats emerging from hibernation has led biologists to consider any mature forests within the bat's known range as potential foraging and maternity roosting habitat (Widlak 1997). Females leave hibernation sites in late March and April; males leave slightly later (USFWS 1999). Even in migratory populations, some males remain in the general vicinity of their hibernaculum throughout the summer (Barbour and Davis 1969). The return migration occurs during the late summer; most bats arrive at hibernacula from late August through September. The majority of bats are hibernating by late November, earlier in northern areas (USFWS 1999). They naturally awaken every 8 to 10 days during the winter, remain active for a short period, then return to torpor (Hall 1962, Thomson 1982, Belwood 1998). Hibernating Indiana bats usually congregate in large numbers, and often with other species, including little brown bats (*Myotis lucifugus*), big brown bats (*Eptesicus fuscus*), and northern long-eared bats (*Myotis septentrionalis*) (Kath 2002).

Limestone caves with standing water are preferred for hibernacula. Indiana bats prefer cold temperatures, but they select hibernation sites where freezing is unlikely and where temperatures and relative humidity are stable (below 10°C when they arrive and 3-6º in mid-winter) (BCI 2004a, USFWS 1999). Hibernacula providing roost sites with average temperatures outside these parameters suffered population declines, while those within these ranges showed population increases (Tuttle and Kennedy 2002).

In the summer, pregnant females separate from males and non-reproductive females and form maternity colonies under the loose bark of snags and trees. Roost sites are often in the open or along the edge of a forest with an open canopy and open understory. Maternity roosts may occur in floodplain and riparian forests or in upland forest areas (USFWS 1999, Kurta et al. 2002). They are unlikely to be in mature coniferous forest (SVE Mammal Panel 2003).

Snags and trees of many species have been used for maternity roosts. The presence of exfoliating bark, exposure to sunlight, and proximity to other trees seem more important than tree or snag species (Rommé et al. 1995, USFWS 1999). Most roost trees are larger than other available trees, often with dbh greater than 16 inches (Williams et al. 1993, Rommé et al. 1995, Kurta et al. 2002), although it may be as small as 8 inches (Rommé et al. 1995). Roost trees typically are suitable for only a few years, as exfoliating bark sloughs off and dead trees eventually fall to the ground (Kurta et al. 1995, Clawson 1986, Callahan et al. 1997, Gardner et al. 1991a, Humphrey et al. 1977, Kurta et al. 1993). Maternity colonies typically have one or more primary roosts that receive direct sunlight for much of the day, and alternate roosts in other trees that may be shaded or in the open (Kurta et al. 2002, USFWS 1999). The amount of shading at maternity roosts is variable, from completely unshaded to more than 80 percent canopy cover, although they must receive enough sun exposure to provide thermal protection (Rommé et al. 1995, SVE Mammal Panel 2003). Indiana bats can tolerate some degree of management activity, and limited tree removal may benefit roosts by opening the forest canopy and increasing insolation (USFWS 1999). Males and non-reproductive females seem to spend the summer alone or in small groups in variable habitats. They will use tree roosts (Ford et al. 2002), caves and mines (Handley 1991), and artificial structures (Rommé et al. 1995). Summer roosts of all types are typically within a few hundred meters of streams or rivers (Webster et al. 1985, Hofman 1996, Menzel et al. 2001, Rommé et al. 1995, Kurta et al. 2002).

It is unknown if there are temperature parameters that would help define habitat suitability (SVE Mammal Panel 2002). Hall (1962) indicated that body temperatures of 93°F to 97°F (34-36°C) were thought to be fatal to Indiana bats, but Kurta et al. (1995) demonstrated they could survive body temperatures up to at least 104°F (40°C) in summer. Humphrey et al. (1977) documented roost temperatures averaging 64°F to 73°F (18-23°C). Ambient temperatures must be at least high enough to support insect activity for foraging.

Indiana bats are insectivorous and have the ability to feed opportunistically on whatever flying insects are prevalent in their foraging habitats (Kurta and Whitaker 1998, USFWS 1999). The degree to which Indiana bats might compete with other sympatric bats for food, foraging areas, or other habitat requirements (e.g., roosting sites) is not known (Husar 1976, Belwood and Fullard 1984). Indiana bats fly between about 6 and 100 feet off the ground while foraging, in or beneath the tree canopy, over clearings and farmland, and along forest edges (USFWS 1999, Menzel et al. 2001), although others appear to avoid these areas (Humphrey et al. 1977). Openings and riparian habitat seem to be important for foraging in northern New England (SVE Mammal Panel 2002, Rommé et al. 1995), although bats elsewhere immediately seek out forested conditions when leaving a roost (Carter 2003). On a larger scale, a landscape with 20 to 60 percent forest cover would be ideal for Indiana bat maternity areas, whereas landscape with less than 5 percent forest cover would be unsuitable (Farmer et al. 1997).

Gardner and Cook (2002) evaluated land cover types in the 132 counties known to have evidence of Indiana bat reproduction. Predominant forest types were oak-hickory (15%), maple-beech-birch (3.2%), oak-pine (2.7%), and elm-ash-cottonwood (2.1%). More than three-fourths of the land area in these counties was non-forested. Such non-forested habitats probably cannot provide suitable maternity roost sites, but they may produce a significant quantity of insect prey required by reproductively active females (Gardner and Cook (2002).

Indiana bats exhibit strong site fidelity to hibernacula, as well as to summer colony areas, roosts, and foraging habitat (Hall 1962, Humphrey et al. 1977, Gardner et al. 1991a,b, Callahan et al. 1997).

The Indiana bat is one of nine bat species found in New York. Identifying most of New York's bats is not easy and the Indiana bat is one of the most difficult. Very little is known about Indiana bats in New York during the non-hibernation period. Summer roost habitat can be found throughout the FLNF landscape. An abundance of large trees, both dead and live, exists in all ecological land types. The FLNF contains approximately 50 miles of streams and many small impoundments and wetlands (ranging in size from 1/4 acre to over 12 acres); therefore availability of drinking water is not a limiting factor for Indiana bats on the FLNF.

Limiting Factors and Threats

Access to suitable and secure hibernacula is critical for Indiana bats. The availability of such hibernacula may be a limiting factor in New York and New England (SVE Mammal Panel 2003).

Indiana bats may be more tolerant of some disturbance than other bats, but they are still very vulnerable, during both hibernation and roosting. Indiana bats do awaken naturally during the winter, but disturbance from human presence can increase the regularity and duration of arousal, which elevates metabolic rates and may cause re-clustering, all of which accelerate depletion of bats' fat reserves (Humphrey 1978). Arousal can result in the loss of enough fat to sustain a bat for 10 to 30 days (Thomas et al. 1990, Thomas 1995). Intense disturbance, including studies by biologists, may result in significantly greater impact to bats than disturbance by passing cavers (Humphrey 1978). Bats roost in areas that are dark and inaccessible to predators and most other animals, but they may abandon roosts if disturbed repeatedly (Belwood 1998). Several instances exist where people had purposefully killed large numbers of bats in caves (USFWS 1999).

Indiana bats have low reproductive potential compared to other small mammals. The species' colonial behavior increases the likelihood that disturbance or habitat loss event can impact a large number of bats. These two factors combined mean it can take a long time for their numbers to recover from other threats (USFWS 1999).

Timber harvest has the potential to impact Indiana bat habitat, although some studies indicate that as long as snags and suitable roost trees are protected, habitat may still be used (USFWS 1999, BCI 2004a). Indiana bats can tolerate some degree of management activity, and limited tree removal may benefit roosts by opening the forest canopy and increasing the warmth of roost trees through insolation (USFWS 1999).

Diseases, including rabies, may impact Indiana bat populations, although the incidence of rabies is assumed to be low as it is in other bat species – probably less than 1 percent (Brass 1994 and references cited therein, Belwood 1998).

Insecticides and pesticides used for agriculture and forestry, especially if applied at dusk, have been implicated in the decline of several bat species. Bats are either killed directly through exposure or through reduced abundance

of forage species (Belwood 1998). Heavy metals and other contaminants also can reduce bat populations (Belwood 1998).

Wind turbines used to generate electricity have caused bat mortality in some parts of the United States (Osborn et al. 1997).

Information Gaps

The greatest information gap is whether or not Indiana bats occur on the FLNF. If they do occur on the Forest, are they maternal colonies or males and non-reproductive females? What and where are preferred roosting and foraging habitats?

Management Direction Pertinent to Indiana Bat

There is no specific management direction in the revised Forest Plan for the Indiana bat. Forest-wide management direction, particularly standards and guidelines, address retention of wildlife reserve trees: snags, den trees, and nest trees. These standards and guidelines provide guidance for the numbers, abundance, and distribution of snags, den trees, and nest trees. Several species of bats, including Indiana bats, use these snags and trees for roosting. This management direction applies under all three alternatives.

Old-growth and late-successional forests are landscape attributes that may be used by Indiana bats because they include large trees for roosting and may have an open understory for foraging. Alternative 1 includes 815 acres (5% of the Forest) designated as Ecological or Educational Special Areas, or Existing or Candidate Research Natural Areas on the Forest Plan that would evolve toward old growth characteristics. Alternatives 2 and 3 designate 1,238 acres (8%) and 1,456 acres, respectively, to these areas. The Future Old Forest MA designates additional forest habitat to develop into old growth in Alternative 2 (3,821 acres, 23%) and Alternative 2 (1,118 acres, 7%).

Potential Management Effects

Direct and Indirect Effects

Potential management effects for Indiana bats focus on three fundamental aspects of the species' habitat requirements: winter hibernacula, summer roosting, and foraging. Because there are no hibernacula on or in the vicinity of the FLNF, analysis of potential management effects focuses on roosting and foraging habitat. Recent information suggests that numbers of Indiana bats in hibernacula in the Northeast are increasing. Other new information indicates that both male and female Indiana bats use a wider range of habitats for roosting and foraging than previously thought, which suggests that most of the Forest's acres are suitable summer habitat. Thus, it is prudent to assume that that this species is likely to occur on the FLNF from May through late September, even though numbers likely are very low. The density of Indiana bats in the Finger Lakes Region is estimated at one bat in every 6,000 to 8,000 acres, equivalent to one or two Indiana bats on the FLNF during the non-hibernation period (USDA 2000, USFWS 2000.

Management activities on the FLNF might affect Indiana bats through removal of summer roost trees or other trees having suitable structure and character for use by bats. These projects include timber harvest, management and maintenance of recreational sites, construction and maintenance of roads and trails, removal of hazard trees, wildlife habitat management, prescribed burning, special uses, visual quality management, and cultural resource protection. The likelihood of affecting Indiana bats is extremely low, considering the large number of acres of potential habitat and vast number of potential roost trees available in central New York (including federal, state, and private lands), the small percent of National Forest affected by tree removal in a given year, management standards and guidelines on the Forest directing that most potential roost trees will be retained, and the fact that many tree-removal activities occur during the winter months when Indiana bats are hibernating.

These same management activities also might have a more general effect on the roosting and foraging habitat of Indiana bats through changes in the composition and structure of the Forest. The likelihood for such effects is low, assuming that sufficient roost trees are retained.. Crown closure in optimal habitat is assumed to range from about 50 to 70 percent for foraging and 60 to 80 percent for roosting, although bats prefer roost trees exposed to the warmth of sunlight. On a larger scale, a landscape with at least five percent forest cover is suitable for Indiana bats; 20 to 60 percent forest cover is optimal. The proportion of forest cover on the FLNF would range

from 48 to 56 percent for the three alternatives, suggesting that from the standpoint of forest cover at least, the FLNF represents good habitat.

Of the various forest habitat types available on the FLNF, oak-hickory is the one preferred by Indiana bats. The Oak-Hickory MA included in the proposed FLNF Forest Plan, emphasizes primarily even-aged stands that vary in size, shape, and height. Assuming compliance with management direction that retains known and potential roost trees, timber/vegetation management in forested habitats, and oak-hickory in particular, could enhance roosting and foraging habitat for Indiana bats. Active Indiana bat roost trees have been found in or near sources of disturbance (such as residences, roads, livestock operations, timber harvest, etc.). Preferred roost trees often are in relatively open areas where they receive direct sunlight.

Cumulative Effects
The FLNF is peripheral to the Indiana bats range in New York State; the Forest and the Finger Lakes Region are not important relative to the species' overall distribution (SVE Mammal Panel 2003). The cumulative effects of implementing the proposed Forest Plan under any of the three alternatives would be continued preservation, maintenance, and enhancement of suitable summer roosting and foraging habitat for the species. Long-term, sustainable management of mixed forested and open lands could contribute to the species' long-term viability in the region, particularly if northeastern populations continue to increase.

Determination and Rationale
Implementation of the revised Forest Plan under any of the proposed alternatives ***May Affect*** but is ***Not Likely to Adversely Affect*** the Indiana bat.

This determination is based on the fact that the Plan includes management direction in standards and guidelines to retain potential roost trees (snags, den trees, and nest trees) and management proposed under each alternative would provide adequate diversity and distribution of roosting and foraging habitat. In addition, although Indiana bats may be present in the FLNF, they occur at extremely low density.

This conclusion is consistent with a consultation held with the USFWS in 2000 regarding continued implementation of the 1987 Forest Plan, and potential effects it might have on endangered, threatened, and proposed species. The FWS (USFWS 2000) concluded that the potential for adverse impacts was extremely unlikely and discountable, and continued implementation of the 1987 Plan was "not likely to adversely affect" the Indiana bat.

Bald Eagle

Information presented here on this species is derived from a review of the literature, which is documented in the Forest Plan revision project file referenced in the Bibliography (USFS 2003n, SVE Bird Panel 2003).

Bald eagles are protected in the United States by the Bald Eagle Protection Act, the Migratory Bird Treaty Act, and the Endangered Species Act (ESA). The USFWS initially listed the bald eagle as endangered in the 48 coterminous states under the ESA in 1967 (32 FR 4001), down-listed it to threatened in five states but still endangered in the others in 1978 (43 FR 6233), and ultimately as threatened in 48 states in 1995 (60 FR 36010). New York State lists the bald eagle as threatened (NYDEC 2004b).

Distribution, Status, and Trend
The bald eagle is widely distributed across Canada and all of the United States except Hawaii. Eagles breed throughout most of this range but generally do not winter in the most northerly areas. Bald eagles breed in New York State and all New England states except Vermont, where breeding eagles historically have been rare (Fichtel 1985), and perhaps Rhode Island. During the winter, New England hosts wintering eagles along coastal regions, on open inland waters, and along large rivers such as the Connecticut and Merrimack (DeGraaf and Yamasaki 2001; SVE Bird Panel 2002, 2003).

Bald eagle populations have fluctuated dramatically over the last two centuries. Prior to European settlement of North America, the species was abundant and common across its range, especially where aquatic habitats were abundant. Persecution by humans and the introduction of pesticides led to sharp decreases in eagle populations,

and the species became rare in the contiguous United States during the second half of the 20th Century. Protection under the Bald Eagle Protection Act (1940), the Endangered Species Protection Act (1966), and the Endangered Species Act of 1973, along with restrictions placed on pesticide use, resulted in population increases (Carroll 1988, Buehler 2000). Bald eagle populations are now stable or increasing most portions of their range (SVE Bird Panel 2002, 2003). Breeding Bird Survey data show significant increases in bald eagle numbers in the northeastern United States (Sauer et al. 2003).

The bald eagle appears to be increasing in numbers in New York. The New York Breeding Bird Atlas shows substantial increases in the numbers of confirmed, probable, and possible nest from 1985 to 2000 (NYDEC 2005). New nests have been recorded in proximity to rivers in Steuben, Seneca, and Chemung (SVE Bird Panel 2003). Bald eagles are not known to nest on the FLNF, where they occur rarely, and only as migrants. The nearest known nesting site is on the Montezuma National Wildlife Refuge, in the northern portions of Seneca County about 30 miles north of current FLNF ownership. The only potential nesting area on the Forest would be at Caywood Point.

The Bald eagle is ranked as G4 globally, N5 in Canada, N4 in the United States, and S2S3B/S2N in New York State (NYNHP 2003, NatureServe 2004b)..

Life History and Habitat Relationships

Bald eagles are long-lived birds, living as long as about 30 years in the wild (Buehler 2000) and more than 40 years in captivity (64 FR 36453). Bald eagles typically attain sexual maturity at 4 years of age, but it can be one year earlier or several years later, depending upon population density (Buehler 2000, DeGraaf and Yamasaki 2001).

Eagles in New York lay eggs during mid-March through mid-May. A single brood per year typically includes 2 eggs (SVE Bird Panel 2002, 2003). Nestling period 72-74 days (DeGraaf and Yamasaki 2001). Fledging occurs in late July or early August but the nest remains the focal point for young and adults well into the fall. Up to half of nest departures unsuccessful and young may remain on the ground for weeks before regaining flight ability. Although parents continue to feed them, these grounded birds are more susceptible to predation. Young spend progressively less time with adults and begin learning to hunt on their own by trial and error (Buehler 2000). Mortality is high in juveniles, especially during the first year. Gulls (*Larus* spp.), ravens and crows (*Corvus* spp.), black bears (*Ursus americanus*), raccoons (*Procyon lotor*), bobcats, hawks, and owls are known to prey on eagle eggs, nestlings, and fledglings (Buehler 2000).

Juvenile birds are highly transient during their development; they may show affinity to particular locations, providing early indications of subsequent breeding areas. Prime nest and perch sites may support generations of use (Evans 1994).

Bald eagles may compete with other raptors like the osprey (*Pandion haliaetus*) or golden eagle (*Aquila chrysaetos*), and fish-eating birds like herons and gulls. Carrion may also be used for food, which may result in competition with coyotes, otters (*Lontra canadensis*), bears, and other mammals (Buehler 2000).

Bald eagles breed along large lakes, river, and estuaries in open areas, forests, and mountains. They commonly use large trees adjacent to water for nesting, perching, and roosting (Peterson 1986, Carroll 1988, DeGraaf and Yamasaki 2001). Observed distances from nests to shoreline are variable: about 300 feet (Minnesota), 650 feet in Alaska, and 800 feet in Maine. Distances may be greater where there is human activity along the shore (Kozie 1999). Birds show strong attachment to nesting territory and nest sites, but may abandon a nest if human activity around the nest site.

Bald eagles are very selective for supercanopy white pines as nest trees in New Hampshire and Vermont (SVE Bird panel 2002). One of the most important characteristics of bald eagle nesting habitat is an open forest structure, typically with a canopy closure of less than 40 to 50 percent (Andrew and Mosher 1982, Peterson 1986, Anthony and Isaacs 1989). Vegetation around nest site is not important, except that it is generally undisturbed and probably mature (DeGraaf and Yamasaki 2001, SVE Bird Panel 2002, 2003).

Territory size varies widely based on nesting density and food supply conditions. Average size was about one square kilometer in Minnesota (Buehler 2000).

Bald eagles winter in coastal regions or on large bodies of open water or where fish or other foods, such as deer carcasses, are available (DeGraaf and Yamasaki 2001).

Connectivity or migratory corridors are not critical for bald eagles, as they are capable of migrating or dispersing over unsuitable habitat, provided that suitable stopover habitat is available. Suitability of stopover sites is more related to food availability than to vegetative characteristics (Beuhler 2000).

Limiting Factors and Threats
Known threats include the following:

Human development - Shoreline development and associated loss of nesting, perching, and roosting, and associated foraging habitat is the most significant threat (Buehler 2000).

Direct trauma - One 30-year study indicated that most eagle deaths were due to trauma (23%: including collisions with vehicles, power lines, and structures), gunshot (15%), electrocution (12%), and poisoning (16%) (Franson et al. 1995).

Contaminants - Low reproductive rates have been the biggest obstacle to eagle recovery in Maine. DDE (a metabolite of DDT) was responsible for past reproductive failure range-wide; eggshell thinning has improved since a ban on DDT was imposed in the 1970's. Other environmental contaminants such as PCBs, organophosphates, and heavy metals (especially mercury) continue to pose threats (Buehler, 2000). As predators/scavengers at the top of the food chain, eagles are especially susceptible to bioaccumulation of environmental contaminants (Wiemeyer et al. 1993).

Human disturbance - Minimal human disturbance may be a factor in nest success; eagles are known to abandon nests if human activity occurs near the nest (DeGraaf and Yamasaki 2001). Researchers in Washington recommend prohibiting recreational activity during the first five hours of daylight within 400 meters of eagles to minimize disturbance of feeding behavior, and restricting foot traffic and use of motorboats (Stalmaster and Kaiser 1998). Bald eagles along the Colorado River in Arizona were detected 22 more times in reaches with low human use compared to reaches with moderate to high use (Brown and Stevens 1997).

Fish declines or changes in fisheries, including overfishing, acid rain-related fish declines, and alterations of waterways, could negatively impact the prey base (Kozie 1999).

Information Gaps
Information gaps relative to bald eagles in Maine, New Hampshire, and Vermont include the minimal size of waterbody and the maximal distance between nests and foraging habitat that can support breeding birds (SVE Bird Panel 2002). There are no significant information gaps relative to bald eagles for the FLNF because they do not occur on the Forest (SVE Bird Panel 2003).

Management Direction Pertinent to Bald Eagle
The Forest Plan makes no specific provisions for management of the bald eagle.

Potential Management Effects
Bald eagles have yet to show interest in nesting on lands of the FLNF, although potentially suitable nesting habitat occurs directly adjacent to Seneca Lake. Due to this complete absence on the FLNF, and lack of interest in habitats occurring on the FLNF, continued implementation of the LRMP can have no direct, indirect, or cumulative affect on bald eagles.

Determination and Rationale
Because this species is not known to occupy the FLNF, implementation of the revised Forest Plan, as proposed, will have ***No Effect*** on the bald eagle.

This conclusion is consistent with a consultation held with the USFWS in 2000 regarding continued implementation of the 1987 Forest Plan, and potential effects it might have on endangered, threatened, and proposed species. The FWS (USFWS 2000) concluded that implementation of the 1987 Plan should have ***No Effect*** on the bald eagle.

Bog Turtle

Information presented here on this species is derived from a review of the literature, which is documented in the Forest Plan revision project file referenced in the Bibliography (USFS 2003s, SVE Herpetology Panel 2003).

The FWS listed the northern and southern populations of the bog turtle as threatened under the ESA in 1997 (62 FR 59622). The species is listed as endangered in New York State (NYNHP 2003, NYDEC 2004b).

Distribution, Status, and Trend

The bog turtle occurs in a discontinuous and localized distribution across 12 eastern states from western Massachusetts and Connecticut through northern Georgia. A 250-mile distributional gap in Maryland and Virginia separates northern and southern populations (USFWS 2001). The northern bog turtle has been extirpated from much of its former range, experiencing a 50 percent reduction in range and numbers since the 1970s (USFWS 2001).

The bog turtle is not known to inhabit the FLNF. The nearest know occurrence to the FLNF is a single occurrence at Junius Ponds in northern Seneca County, approximately 30 miles from current NFS ownership. Other disjunct populations occur in southeastern, eastern, and south-central sections of NY (USFWS 2001).

The bog turtle is ranked by NatureServe (2004b) as G3 globally, N3 in the United States, and S2 in New York State (NYNHP 2003).

Life History and Habitat Relationships

The following summarizes information found in USFWS (2001) and NYDEC (2004a).

The bog turtle is New York's smallest turtle, reaching a maximum length of 4.5 inches. It is one of 17 species of turtles found in New York State, including marine turtles. In New York, bog turtles hibernate from late October through mid-April, often communally with other bog turtles and with spotted turtles (*Clemmys guttata*). Hibernation sites include abandoned muskrat lodges or other burrows. Typically both air and water temperature must exceed 50° F before bog turtles emerge and become active. Nests frequently are located inside the upper part of an un-shaded tussock. Young turtles hatch in mid-September and may spend the winter in the nest, emerging the following spring. Bog turtles are opportunistic feeders, preferring invertebrates such as slugs, worms, and insects, but also eating seeds, plant leaves, and carrion.

Bog turtles are semi-aquatic, preferring habitat with cool, shallow, slow-moving water, deep soft muck soils, and tussock-forming herbaceous vegetation. In New York, the bog turtle is generally found in open-canopy, early successional habitats such as wet meadows or open calcareous boggy areas generally dominated by sedges (*Carex spp.*) or sphagnum moss. Like other cold-blooded or ectothermic species, it requires habitats with a good deal of solar penetration for basking and nesting. Plants such as purple loosestrife (*Lythrum salicaria*) and reed (*Phragmites australis*) can quickly invade such areas resulting in the loss of basking and nesting habitat. Canopy closure through natural succession of vegetation also can make wetland habitats unsuitable for bog turtles.

Currently there are no wetland habitats on the FLNF suitable for bog turtles (Peter Rosenbaum, Andy Nelson, Robyn Niver, personal communication to D. Clayton Grove, 19 August 2003).

Limiting Factors and Threats

Loss or degradation of habitat and illegal collecting are the primary threats to bog turtles. In New York, development and natural succession are the major threat to bog turtle habitat. Roads and other aspects of development severely inhibit turtles' ability to disperse and find suitable habitat elsewhere. Consequently new populations are not being established as old sites deteriorate (USFWS 2001, NYDEC 2004a).

Illegal collection for commercial or private use is the second greatest threat to bog turtles. In 1975, the species was listed on CITES (Convention of International Trade in Endangered Species) Appendix II. In 1992, it was transferred to Appendix I because of increased concern over illegal trade (57 FR 7722, USFWS 2001). Collection of the bog turtle without a permit is prohibited in New York and all other states where it occurs (NYDEC 2004a).

Contamination by pesticides and other chemical pollutants, septic or agricultural run-off, or nutrient enrichment can affect bog turtles directly or by affecting growth of vegetation that can alter canopy closure. Contaminates may also accumulate in or adversely affect the turtle's invertebrate food supply (USFWS 2001, NYDEC 2004a).

Currently there are no wetland habitats on the FLNF suitable for bog turtles (Peter Rosenbaum, Andy Nelson, Robyn Niver, personal communication to D. Clayton Grove, 19 August 2003).

Information Gaps
Given that bog turtles do not exist currently on the FLNF and are not likely to occur on the Forest in the near future given the lack of suitable habitat, there are no information gaps relative to this species and the FLNF Plan revision process.

Management Direction Pertinent to Bog Turtle
The Forest Plan makes no specific provisions for management of the bog turtle. Suitable habitat for this species has not been identified on the Forest, however Forest-wide standards and guidelines for activities in and near riparian areas and for management of wetlands and ponds provide protection of these areas. This management direction applies under all three alternatives.

Potential Management Effects
Due to absence of bog turtles on the FLNF, continued implementation of the revised Forest Plan can have no direct, indirect, or cumulative affect on bog turtles. The quality of potentially suitable wetland habitat will continue to be protected, and enhanced, through adherence to established standards and guidelines.

Determination and Rationale
Because this species is not known to occupy the FLNF, implementation of the revised Forest Plan, as proposed, will have ***No Effect*** on the bog turtle.

This conclusion is consistent with a consultation held with the USFWS in 2000 regarding continued implementation of the 1987 Forest Plan, and potential effects it might have on endangered, threatened, and proposed species. The FWS (USFWS 2000) concluded that implementation of the 1987 Plan should have ***No Effect*** on the bog turtle.

Leedy's Roseroot

Distribution, Status, and Trend
Most of this review is based upon a report published by the Minnesota Natural Heritage Program in 1993. Leedy's roseroot is a cliff-dwelling plant found today at only six sites in the world, in two states (4 sites in Minnesota and 2 sites in New York). The USFWS listed Leedy's roseroot as threatened under the ESA in 1992 (57 FR 14649). New York State also lists it as Endangered. With such a widely separated distribution, this species is considered disjunct. The species is also considered to be a glacial relict, becoming more isolated as climate and conditions have changed since the last glaciation. Consequently, as with other disjunct species and glacial relicts, there are concerns regarding the species long-term viability, both from the perspective of natural loss of habitat from climate change and loss of genetic diversity due to poor dispersal and inbreeding.

Leedy's roseroot is not known to occur on the FLNF. There are only two sites for the species in New York State, a large population on the western shore of Seneca Lake and a single plant at Watkins Glen.

Leedy's roseroot is ranked by NatureServe (2004b) as G5T1 globally, N1 in the United States, and S1 in New York State (Young and Weldy 2004). The Biological Assessment for the FLNF in 2000 concluded that this species was unlikely to occur on the Forest (USDA 2000, USFWS 2000).

Life History and Habitat Relationships
The following summarizes information found in Minnesota Natural Heritage Program Biological Report #42 (MNHP 1993).

Leedy's roseroot is a member of the stonecrop family, which is distinguished by thick waxy leaves that tolerate water stress. Jade plant is also a member of this family, and several stonecrops are cultivated for use in rock gardens. It is one of four native *Sedum* species in New York, only one of which is common. Three additional species of *Sedum* found in the wild in New York are non-native, having escaped from cultivation.

Leedy's roseroot is a perennial, with an elongate, leafy stem of closely packed, succulent leaves. Flowers are 4- to 5-petaled in dense heads at the top of the stems, and vary from dark red to yellow. As male and female flowers are formed separately on separate plants, both are required for successful sexual reproduction. The species flowers in late May through early July, and fruits in late July. Nothing is apparently known regarding the relative use of sexual vs. vegetative reproduction, although it's likely that the populations do expand vegetatively as is common among *Sedum* species. There is also little known about the species' pollinators or any particulars regarding sexual reproduction.

Habitat preferences for Leedy's roseroot are fairly distinct. This is a species of cool cliffs, and in Minnesota it occurs in cliff habitat characterized specifically by the presence of cracks in the rock that lead to cold underground caves. The species appears to have a strong preference for the areas where the cool air from the caves escapes at the cliff surface. In New York, both populations occur along the west shore of Seneca Lake. The habitat characteristics likely to provide suitable conditions for Leedy's roseroot here are the east-facing exposure of cliffs which limits solar radiation, the deep lake which maintains a cooler microclimate along the shore, and seeps that provide moisture and cooling to the cliff site itself (USDA 2000).

Currently there are no cliff habitats on the FLNF likely to provide suitable habitat. Steve Young, during inventories of the shoreline of Seneca Lake in the early 1990s, indicated that he did not believe the eastern shoreline of Seneca Lake, with its western exposure, provided suitable habitat for the species, and concluded that the FLNF was unlikely to provide habitat for this species (Steve Young, personal communication to D. Burbank, 8 July 2002)

Limiting Factors and Threats

The following summarizes information found in Minnesota Natural Heritage Program Biological Report #42 (MNHP 1993). These factors and threats are associated with existing populations of the species and its habitats. Since the FLNF does not have any populations or suitable habitat, this information is provided for context, should the Forest someday acquire land with potentially suitable habitat or populations.

Leedy's roseroot is a species whose rarity is caused more by its history, the special conditions of its unique cliffside habitat, and the infrequency of that habitat in the landscape; than by direct habitat destruction.

Despite the fact that Leedy's roseroot has probably been rare for thousands of years, increased human activities could degrade its habitat. Unlike species with a wider range of preferred living conditions, it has nowhere else to go if its cliffside habitat is destroyed.

Although the steepness of the cliffs protect Leedy's roseroot from most direct impacts, surface runoff from disturbed lands can dislodge plants or bury them during heavy rains and spring thaws. This impact is enhanced in areas where soil disturbance occurs at the top of the cliffs. New York populations occur downhill from a number of lakeside homes. Tree cutting uphill of the plants, staircases and pipes to the lakeshore, and clearance of vegetation on the cliffs could have a negative impact on the plants.

Information Gaps

Given that Leedy's roseroot does not exist currently on the FLNF and is not likely to occur on the Forest in the near future given the lack of suitable habitat, there are no information gaps relative to this species and the FLNF Plan revision process.

Management Direction Pertinent to Leedy's Roseroot

The Forest Plan makes no specific provisions for management of Leedy's roseroot. Suitable habitat for this species has not been found on the Forest. Inventories by the NYNHP of the entire eastern shoreline of Seneca Lake for suitable habitat have found that the western exposure of this shoreline makes it generally unsuitable for the species. Should suitable habitat eventually be acquired, management direction for protection of federally-listed species, and for protection of steep slopes, would apply.

Potential Management Effects

Due to absence of Leedy's roseroot on the FLNF, or suitable habitat, continued implementation of the revised Forest Plan can have no direct, indirect, or cumulative affect on individuals or populations of this species. If land is eventually acquired along the western shoreline of Seneca Lake where potentially suitable habitat and known populations exist, consultation would be reinitiated.

Determination and Rationale

Because this species is not known to occupy the FLNF, implementation of the revised Forest Plan, as proposed, will have ***No Effect*** on the Leedy's roseroot.

This conclusion is consistent with a consultation held with the USFWS in 2000 regarding continued implementation of the 1987 Forest Plan, and potential effects it might have on endangered, threatened, and proposed species. The FWS (USFWS 2000) concluded that implementation of the 1987 Plan should have ***No Effect*** on the Leedy's roseroot.

Chapter 4 – Analysis of Effects, Regional Forester Sensitive Species

Summary of Species Determinations

After reviewing the proposed action and alternatives, the literature and records, and consulting individuals, the following determinations regarding the Proposed Action and alternatives are made:

The Biological Evaluation has determined that the revised Forest Plan and its alternatives will have **No Impact** on the following species:

- Green floater (*Lasmigona subviridis*)

The Biological Evaluation has also concluded that the revised Forest Plan and its alternatives **May Impact Individuals but is Not Likely to Result in a Trend to Federal Listing or Loss of Viability** for the following species:

- Northern goshawk (*Accipiter gentiles*)
- Henslow's sparrow (*Ammodramus henslowii*)
- Upland sandpiper (*Bartramia longicauda*)
- Northern harrier (*Circus cyaneus*)
- Eastern small-footed bat (*Myotis leibii*)
- West Virginia white (*Pieris virginiensis*)
- Wild onion (*Allium cernuum*)
- Wild indigo (*Baptisia tinctoria*)
- Butternut (*Juglans cinerea*)
- Water-marigold (*Megalodonta beckii* var*. beckii*)
- Broad beech fern (*Phegopteris hexagonoptera*)
- Black-fruit mountain-ricegrass (*Piptatherum racemosum*)
- Culver's-root (*Veronicastrum virginicum*)

Effects Common to All Alternatives

All alternatives promote the protection, enhancement or maintenance of species of viability concern and the habitats on which these species depend. This level of attention is driven by laws, regulations, and agency policy, all of which require the agency to maintain viable populations. While the role that the FLNF plays in contributing to the conservation of these species varies by alternative (for example by providing differing amounts and quality of suitable habitat conditions), all alternatives were developed with the premise that viability will be maintained. Where adverse impacts cannot be avoided, management must not result in a trend toward federal listing.

The goals, objectives, standards, guidelines, and management area direction noted in Chapter 2 will be applied when developing and implementing management activities on the FLNF. The direction for TES species contained

within these elements of the revised Forest Plan does not vary by alternative, and so there are no differences in effects on RFSS due to this direction across alternatives.

Direction for protection of RFSS found in agency and departmental policies and regulations set a high standard for ensuring limited negative effects of management activities on these species. This direction, in combination with goals, objectives, standards, and guidelines, is designed to ensure that when management activities do occur, any effects on species are not likely to result in a trend toward federal listing or a loss of viability on the Forest. However, depending on the species of concern, management activities can still have positive or negative effects without resulting in these trends or losses. The effects analyses below for each RFSS detail the impacts that can result from management activities. Because management activities can be allowed or prohibited depending upon direction associated with each management area, and because management areas are distributed differently across the Forest depending on the alternative, the general level or extent of the effects on each species may also vary by alternative. When this is the case, those differences are also discussed below.

Northern Goshawk

Information presented here on this species is derived from a review of the literature, which is documented in the Forest Plan revision project file referenced in the Bibliography (USFS 2003o, SVE Bird Panel 2003).

In 1998, the USFWS found that listing this population as endangered or threatened was not warranted (63 FR 35183). The northern goshawk is listed among the Regional Forester's Sensitive Species (RFSS). New York State lists the northern goshawk as a Species of Special Concern (NYDEC 2004b).

Distribution, Status, and Trend

The northern goshawk occurs in temperate and boreal forests of North America, Europe, and Asia. In North America, the northern goshawk breeds across Alaska and Canada southward over much of the lower 48 contiguous states, including central New York and much of New England (DeGraaf and Yamasaki 2001, 63 FR 35183). Winter distribution can extend to southern California and the Gulf States (63 FR 35183).

The northern goshawk is considered an uncommon breeder in New York State even though it occurs widely in across the state and numbers may be increasing. It occurs in all but 11 counties in the state, most notably absent from Long Island and New York City (Andrle and Carroll 1988, Eaton 1988a). This species occurs on the FLNF only in small numbers; the Forest and adjacent region are not important to the species' overall distribution (SVE Bird Panel 2003). The goshawk does nest on the Forest, although the land base may not be big enough to support many breeding pairs (Smith and Brown 1994, SVE Bird Panel 2003).

The current status of the northern goshawk is G5 globally, N5 in Canada, N4B in the United States, N1B in Canada, and S4B,S3N in New York State (NatureServe 2004b). North American Breeding Bird Survey data show that numbers of northern goshawks declined significantly from 1966 to 2002 in New York and for the northeastern United States in general, but there is no apparent trend at either scale from 1980 to 2002 (Sauer et al. 2003). The New York Breeding Bird Atlas shows little change in the past 20 years (NYDEC 2005).

Life History and Habitat Relationships

Northern goshawks mature at 2 to 3 years of age. They can nest annually, with typically 3 or 4 eggs per clutch. In Massachusetts, egg laying takes place from early April through mid- May. Incubation is 36 to 38 days, followed by another 34 to 37 days before fledging (DeGraaf and Yamasaki, 2001). Hatchings are semi-altricial and nidicolous; parents care for and feed young in the nest for about 6 weeks, and in the vicinity of the nest for another 4 weeks (Squires and Reynolds, 1997). Goshawks are well known for fierce defense of their nests, attacking red-tailed hawks (*Buteo jamaicensis*), short-eared and great horned owls (*Bubo virginianus*), and humans that approach to closely (Squires and Reynolds 1997).

Little is known about life expectancy for goshawks, but maximum life span of wild birds probably is at least 11 years. Females may to be more vulnerable to food shortage than males (Squires and Reynolds 1997).

Migration is poorly understood for North American birds. Data suggest the species is a partial migrant, as birds may leave breeding areas during winter in response to inadequate food availability. Some goshawks may

undergo only short winter movements to lower elevations or to more open habitat types. Irruptive movements of northern birds to the south occur at approximately 10-year intervals, coinciding with population lows of snowshoe hare and grouse (Squires and Reynolds 1997). Goshawks may associate with other raptors during migration but they are not considered social.

Goshawks prey preferentially on small- to medium-sized birds, but also on tree squirrels, hares, and other small mammals (Watson et al. 1998, Squires 2000, DeGraaf and Yamasaki 2001). Goshawks and coopers hawks (*Accipiter cooperi*) overlap broadly in prey size, but where the two species occur together they frequently segregating feeding niches according to prey size or by foraging areas (Reynolds and Meslow 1984, Bosakowski et al. 1992).

Goshawks have few natural predators. Goshawk nestlings may exhibit siblicide as a mechanism for brood reduction when food is limited (Estes et al. 1999). Great horned owls kill adults and nestlings, eagles occasionally kill wintering birds, and wolverines (*Gulo gulo*) have killed chicks in the nest (Squires and Reynolds 1997). Reintroduction of fishers (*Martes pennanti*) is blamed for the increased nest failure and adult female mortality of northern goshawks in Wisconsin (Erdman et al, 1998)

Goshawks inhabit the interior of mature, coniferous (hemlock & white pine) and mixed forests in temperate and boreal regions, from sea level to treeline. They prefer mature forests with large trees with open understories (Ellison 1985, Janeway 1994, DeGraaf and Yamasaki, 2001). Nests are typically in mature to old growth forests composed primarily of large trees with high (60-90%) canopy closure near the bottom of moderate hill slopes with sparse ground cover (Squires and Reynolds, 1997). Nesting tree is often deciduous with beech most commonly used and poplar frequently used in the Allegany Hills.

Meadows and other open areas provide foraging areas and travel corridors, facilitate nest access, and reduce flight barriers to fledglings; in eastern deciduous forests, nests were significantly closer to woods roads and trails than to random points (Squires and Reynolds, 1997).

Forest stands containing nests can be as small as 25 acres, but typically are larger than 50 acres. A breeding pair's territory may contain 1 to 5 alternate nest areas. Occupancy rates for nest sites were positively correlated with stand size (Squires and Reynolds 1997). Free water of any form is often present near nests but is not a habitat requirement (Squires and Reynolds, 1997).

Goshawk morphology and behavior are adapted for hunting in moderately dense, mature forests; prey availability probably is more important than prey density in habitat selection (Beier and Drennan 1997).

Limiting Factors and Threats

Timber harvest is a primary threat to nesting populations. Nests may be destroyed and timbering activities within 150 to 300 feet of nests can cause failure or abandonment, especially during incubation. Harvesting that produces large areas of reduced forest canopy cover (less than 35-40%) may be especially detrimental.

Goshawks generally are intolerant to human disturbance during nesting (DeGraaf and Yamasaki, 2001). Goshawks are known to strike and draw blood from persons approaching nests (Squires and Reynolds 1997).

Information Gaps

The SVE Bird Panel (2003) did not identify any information gaps related to northern goshawks and management of the FLNF.

Management Direction Pertinent to Northern Goshawk

The proposed Forest Plan includes two standards that are specific to northern goshawks. First, all management within 660 feet of a goshawk nest must conserve or enhance the site conditions. Second, all activities, including recreational uses, must be excluded within 1,320 feet of an active nest between April 15 and July 31. In addition, forest-wide goals, objectives, standards, guidelines, and overall agency policy that apply to RFSS and to wildlife habitat in general provide added protection for goshawks and their habitat. This management direction applies under all three alternatives.

Potential Management Effects

Direct and Indirect Effects
Potential management effects do not vary by alternative for the northern goshawk, as all alternatives have the same applicable management direction. Each alternative provides adequate potential habitat for nesting and foraging. Activities most likely to adversely affect northern goshawks relate to disturbance at nest sites, which are regulated by Forest-wide standards that apply to all alternatives. Alternative 2 proposes allocating the greatest area (3,821 acres) to the Future Old Forest MA. Although this MA could provide an added measure of nesting protection from timber management activity and motorized recreation, it would not provide any additional protection against disturbance from hikers. Conversely, Future Old Forest would prohibit timber management activity that could enhance foraging habitat, but adequate foraging habitat is unlikely to be limiting under Alternative 2. In summary, differences between the direct and indirect effects of the three alternatives on the northern goshawk are equivocal.

Cumulative Effects
The FLNF and the Finger Lakes Region are not of particular concern relative to the species' overall range because the Forest represents an extremely small proportion of the available habitat for northern goshawks in northeastern North America (SVE Bird Panel 2003). The cumulative effects of implementing the proposed Forest Plan will be continued preservation of suitable nesting and foraging habitat on the FLNF, which constitutes an important contribution to the status of the species in the Finger Lakes region, in New York State, and in the northeast.

Determination and Rationale
Implementation of the revised Forest Plan and any of the proposed alternatives may impact individual northern goshawks, but management actions prescribed by the Plan are ***unlikely to result in a trend toward federal listing or a loss of viability on the FLNF***. This determination is based on the fact that the Plan includes standards to protect goshawk nests from disturbance or habitat degradation, and the management proposed under each alternative would provide adequate diversity and distribution of foraging habitat.

Henslow's Sparrow

Information presented here on this species is derived from a review of the literature, which is documented in the Forest Plan revision project file referenced in the Bibliography (USFS 2003r, SVE Bird Panel 2003).

Henslow's sparrow is listed among the Regional Forester's Sensitive Species (RFSS). New York State lists Henslow's sparrow as threatened (NYDEC 2004b).

Distribution, Status, and Trend
Henslow's sparrow occurs from Manitoba east to Quebec and south to Texas and Florida (Herkert et al. 2002). It rarely occurs in New England (DeGraaf and Yamasaki 2001). It breeds in the northern third or half of the overall range and winters in costal states from South Carolina south to Florida, and west to eastern and rarely southern Texas. It is a casual winter resident in Illinois, Indiana, New England and Nova Scotia (Smith 1992, NatureServe 2004b). Within this range, distribution is spotty because of habitat alteration (Herkert et al. 2002).

In New York State, Henslow's sparrow is considered of limited distribution and likely numerically rare. It has been reported as confirmed, probable, or possible breeders on widely scattered sites in Onondaga, Albany, Jefferson, Livingston, Orange, Ulster, Oswego, and Wyoming Counties (Eaton 1988c, SVE Bird Panel 2003).

The FLNF is central to the species' NY range, and the bird is known to nest on the Forest in both Schuyler County and Seneca County (Smith and Brown 1994, Gregory and Smith 1996). Currently, a total of seven occurrences have been found off the Forest in Yates, Schuyler, Seneca, Tompkins, and Cayuga Counties. A population of 30 singing males was censused in 1997 in Schuyler County. There are no documented historic occurrences on or off the forest (SVE Bird Panel 2003). The FLH and FLNF are not of special concern relative to the rest of the species' range; however, the region is important for the northeastern and/or in the New York State populations (SVE Bird Panel 2003).

The current status of Henslow's sparrow is G5 globally, N3B in the United States, N1B in Canada, and S3B in New York State (NYNHP 2003, NatureServe 2004b). North American Breeding Bird Survey data show that numbers of Henslow's sparrows declined significantly from 1966 to 2002 in New York and for the northeastern United States in general, although the regional trend is not significant for 1980 to 2002 (Sauer et al. 2003). The New York Breeding Bird Atlas also shows a dramatic decline over the past 20 years (NYDEC 2005).

Life History and Habitat Relationships

Nesting begins in mid-May. The female lays 3-5 eggs, and incubates them for approximately 11 days (Herkert et al. 2002, O'Kane and Johns 2003). Henslow's sparrows usually raise two broods, but sometimes three (Smith 1992). Second nests are initiated in July and August with some extending into September (Smith 1992, Herkert et al. 2002). Young fledge about 9-11 days after hatching.

Northward migration begins in March, by the middle of May they have arrived at the northern limits of their range in New England and southern Ontario (Smith 1992).

Henslow's sparrow forages on the ground, eating crickets, grasshoppers, beetles, caterpillars, and other insects, spiders, and seeds of herbaceous plants (Terres 1980 cited in NatureServe 2004b, Hyde 1939 and Robins 1971 cited in Swanson 1996). When feeding their young, Henslow's sparrows fed nestlings greater proportions of Lepidoptera and Orthoptera than were available in the fields analyzed for insect population percentages (Kobal et al. 1998).

Predators include ground squirrel, skunks, weasels, raccoons, snakes, and various raptors. The brown-headed cowbird (*Molothrus ater*) is a known nest parasite (Smith 1992, Herkert et al. 2002).

Henslow's sparrows breed in a variety of grassland habitats with tall, dense grass, and herbaceous vegetation, including hayfields, pastures, wet meadows, dry saltmarsh areas, and old grassy fields (Smith 1992, Herkert et al. 2002). In New York, Henslow's Sparrows nests in abandoned hilltop farms, grassy ridgetops, fallow fields, and pastures (Burhans 2001). They tend to avoid habitat edges (Bajema and Lima 2001).

Observed breeding territories in the FLNF were 75 acres or larger (1983 cited in Mitchell et al. 2000, Smith 1997, Walk and Warner 1999). O'Leary and Nyberg (2000 found that Henslow's Sparrows avoided fields smaller than 10-12 acres that were separated from larger sites (30-40 acres) by only a treeline. In New York, Mazur (1996) found that Henslow's Sparrows occupied fields as small as 7 acres when they were adjacent to larger fields. Individual territory size ranges from about 0.75 to 1.5 acres, increasing through the summer. This increase may reflect movements of adults in response to the wanderings of recently fledged young that still require parental care (Smith 1992, Herkert et al. 2002).

The species can find and colonize remote sites, thus connectivity does not seem to be necessary (Askins1999).

Limiting Factors and Threats

Henslow's sparrow is especially vulnerable to habitat fragmentation.

Predation, parasitism and drought represent potential threats.

Appropriate management is critical for maintenance of suitable habitat, especially focusing on grassland height, age, and patch size. Poorly timed of maintenance activity can destroy nests.

Although small grasslands of potentially suitable habitat exist, numerous studies indicate that Henslow's sparrows require large habitats, especially on the breeding range.

Grassland habitats generally are diminishing in availability and quality in the Allegheny Plateau and Lower Great Lakes Plain ecological regions, which cover most of central New York. Consequently, there are regional conservation and viability concerns over many grassland dependent species, including Henslow's sparrows, upland sandpipers, and northern harriers (Dettmers and Rosenberg 2003, Robertson and Rosenberg 2003).

Information Gaps
Lifespan for Henslow's sparrow and survival rate for progeny are unknown. Preferences for soil pH and terrestrial habitat features are unknown. In wetland habitats, preferred water alkalinity and nutrient availability are unknown

Management Direction Pertinent to Henslow's Sparrow
There is no specific management direction in the revised Forest Plan for Henslow's sparrow, however Forest-wide management direction includes significant emphasis on grassland habitats in the goals and objectives. Standards and guidelines provide direction to enhance the quality of grassland habitat and minimize the likelihood that management actions will interfere with foraging, nesting, and brood rearing of Henslow's sparrow and other grassland species. This management direction applies under all three alternatives.

Potential Management Effects

Direct and Indirect Effects
Potential management effects do not vary by alternative for Henslow's sparrow, as all alternatives have the same applicable management direction. This is a grassland species, and it requires grassland habitat in parcels large enough to provide a horizon. Alternative 1 allocates slightly more area to combined Grassland for Wildlife and Grassland for Grazing (6,348 acres, 39% of the FLNF lands) than Alternatives 2 and 3 (5,938 acres, 36%), but Alternatives 2 and 3 allocate slightly more grassland (252 acres, 1.5%) to wildlife than to grazing. However, all three alternatives provide adequate grassland habitat for Henslow's sparrow, and the differences between the direct and indirect effects of the three alternatives are equivocal.

Cumulative Effects
The FLNF and the Finger Lakes Region are not of particular concern relative to the species' overall range; however, the Finger Lakes Region is important for the Northeastern and the New York State populations (SVE Bird Panel 2003). Current trends suggest that the availability and quality of grasslands in central New York may continue to diminish in the future (Dettmers and Rosenberg 2003, Robertson and Rosenberg 2003). The cumulative effects of implementing the proposed Forest Plan under any of the three alternatives will be continued preservation of suitable nesting and foraging habitat for Henslow's sparrow on the Forest. Long-term, sustainable management of grassland habitats would contribute to the species' long-term viability in the region. Although the Forest represents an important component to the species' status in the region, these benefits may be overshadowed by habitat losses off the Forest, particularly as grazing land, pastures, and other grasslands revert to forested habitats.

Determination and Rationale
Implementation of the revised Forest Plan and any of the proposed alternatives may impact individual Henslow's sparrows, but management actions prescribed by the Plan are ***unlikely to result in a trend toward federal listing or a loss of viability on the FLNF***. This determination is based on the fact that the proposed Plan includes goals, objectives, standards, and guidelines to allocate more than 30 percent of the Forest to grassland habitats, to maintain and enhance the quality of these grassland habitats, and to plan management actions so as to minimize the likelihood of interfering with nesting and brood rearing of grassland species.

Upland Sandpiper

Information presented here on this species is derived from a review of the literature, which is documented in the Forest Plan revision project file referenced in the Bibliography (USFS 2003q, SVE Bird Panel 2003).

The upland sandpiper is listed among the Regional Forester's Sensitive Species (RFSS). New York State lists the upland sandpiper as threatened (NYDEC 2004b).

Distribution, Status, and Trend
The breeding range for upland sandpipers extends from southern Alberta to southern Ontario and Quebec on the north, and from Montana , Oklahoma, and western Missouri to Pennsylvania, central New York, and Vermont in the east, with spotty distribution along Atlantic Coast from the Canadian Maritime Provinces to Delaware. Disjunct populations occur in north-central Alaska, Yukon, southwestern Northwest Territories, northeastern British Columbia, Oregon, and western Idaho. It is largely absent from parts of Michigan, Indiana, Ohio,

Pennsylvania, southeastern New York, and the Adirondack Mountains (Houston and Bowen 2001, NatureServe 2004b). Non-breeding range includes South America east of Andes, from Suriname and northern Brazil south to central Argentina and Urugay (White 1988). The species is casual or accidental in Greenland, Iceland, the British Isles and continental Europe, Azores, and Australia (Houston and Bowen 2001).

The upland sandpiper is a widespread but uncommon breeding bird in New York State (Andrle and Carroll 1988, Eaton 1988b). A significant population exists on Long Island; one of the largest breeding populations in the East is located at JFK International Airport (Garber et al. 1997).

The FLNF and vicinity probably are not of particular importance to the species. Most occurrences on the Forest are migrants. There is one known observance of a singing bird on the Forest, therefore it may be nesting there as well (Smith and Brown 1994, Brubaker and Gregoire 2001, SVE Bird Panel 2003).

Within the United States and Canada the upland sandpiper it is listed as apparently secure; global and national statuses are G5 and N5B, respectively (NatureServe 2004b). In New York State it is ranked S3B (NYNHP 2003, NatureServe 2004b) or S4 (Carter et al. 1992). North American Breeding Bird Survey data show a non-significant decline for upland sandpipers in New York from 1966 to 2002, but no discernable trend in New York for 1980 to 2003 or for the northeastern United States in general (Sauer et al. 2003). The New York Breeding Bird Atlas, however, shows a dramatic decline in the numbers of confirmed, probable, and possible nesting pairs little in the past 20 years (NYDEC 2005).

Life History and Habitat Relationships

Upland sandpipers nest on the ground. They breed annually beginning when one year old. As is the case for most shore birds, clutch typically is four eggs (Bent 1929 cited in Carter et al. 1992, Higgins and Kirsch 1975 cited in Carter et al. 1992). Egg laying ranges from April to June (Goodpaster and Maslowski 1948 cited in Houston and Bowen 2001), and incubation takes about 24 days. Young are precocial; they leave the nest within 24 hours after hatching and fly within about 30-34 days (Ailes 1980, cited in Carter et al. 1992). Breeding pairs typically spend only a few months in their North American habitats. The upland sandpiper is a complete, long-distant migrant between its breeding areas in North America and its winter home in South America; migration begins generally in July and August, depending on latitude. (Houston and Bowen 2001).

Upland sandpipers exhibit a strong preference for grasslands of various heights for foraging, nesting, and brood rearing, with few shrubs present (Dechant et al. 2001). They will not occupy shrubby habitats unless suitable grasslands are nearby (Carter et al. 1992). They will use plowed and seeded fields, sedge (Carex)/grass meadows, successional old fields, mowed fields of red clover (*Trifolium pratense*), corn fields, idle fields, and cropland (Dechant et al. 2001). “Light” grazing can be tolerated (SVE Bird Panel 2003). Wooden fence posts are important for territorial displays and singing (SVE Bird Panel 2003). Minimum successful range sizes have been placed 500 acres or more (Dechant et al. 2001).

Upland sandpipers feed primarily on grassland insects, especially grasshoppers, crickets, and beetles (Houston and Bowen 2001.

Predators include great horned owls, domestic cats, and coyotes, and presumably other nest predators such as skunks and raccoons (SVE Bird Panel 2003).

Limiting Factors and Threats

Loss of habitat is identified as the greatest single factor in this species’ decline. Due to the large patch size required, the species is especially sensitive to fragmentation. In several studies, the upland sandpiper has not been found in areas smaller than 75 acres.

The single greatest threat to the species is conversion of grasslands to agricultural lands. Early cutting of hay fields can destroy nests and kill pre-flight young. Grazing can result in trampling of nests (Carter et al. 1992, SVE Bird Panel 2003).

Without management, many suitable grassland habitats undergo successional changes in vegetation, eliminating what was once viable habitat (SVE Bird Panel 2003).

Grassland habitats generally are diminishing in availability and quality in the Allegheny Plateau and Lower Great Lakes Plain ecological regions, which cover most of central New York. Consequently, there are regional conservation and viability concerns over many grassland dependent species, including Henslow's sparrows, upland sandpipers, and northern harriers (Dettmers and Rosenberg 2003, Robertson and Rosenberg 2003).

Information Gaps
The greatest information gap relative to the upland sandpiper on the FLNF is its abundance and distribution on the Forest, and whether or not this species is nesting on the Forest.

Management Direction Pertinent to Upland Sandpiper
There is no specific management direction in the revised Forest Plan for the upland sandpiper, however Forest-wide management direction includes significant emphasis on grassland habitats in the goals and objectives. Standards and guidelines provide direction to enhance the quality of grassland habitat and minimize the likelihood that management actions will interfere with foraging, nesting, and brood rearing of the upland sandpiper and other grassland species. This management direction applies under all three alternatives.

Potential Management Effects

Direct and Indirect Effects
Differences between alternatives are minimal when considering potential management effects for the upland sandpiper. This is a grassland species; goals, objectives, standards, and guidelines common to all alternatives allocate more than 30 percent of the Forest to grassland habitats and provide direction for maintenance and enhancement of these grassland habitats. Alternative 1 allocates slightly more area to combined Grassland for Wildlife and Grassland for Grazing (6,348 acres, 39% of the FLNF lands) than Alternatives 2 and 3 (5,938 acres, 36%), but Alternatives 2 and 3 allocate slightly more grassland (252 acres, 1.5%) to wildlife than to grazing. Nesting upland sandpipers can be vulnerable to disturbance from intensive grazing, so the species could benefit from a greater acreage in non-grazed grassland. To date, however, upland sandpipers have not been found nesting on the Forest. All three alternatives provide adequate grassland habitat for upland sandpipers, and the differences between the direct and indirect effects of the three alternatives are equivocal.

Cumulative Effects
The FLNF and the Finger Lakes Region are not of particular importance relative to the species' overall range (SVE Bird Panel 2003). Current trends suggest that the availability and quality of grasslands in central New York may continue to diminish in the future (Dettmers and Rosenberg 2003, Robertson and Rosenberg 2003). The cumulative effects of implementing the proposed Forest Plan under any of the three alternatives will be continued preservation, maintenance, and enhancement of suitable nesting and foraging habitat for upland sandpipers and other grassland species on the Forest. Upland sandpipers are not known currently to nest on the Forest, although the Forest could provide an important contribution to the overall status of the species in the Finger Lakes region, New York State, and the northeast should the species move onto the Forest. Long-term, sustainable management of grassland habitats would contribute to the species' long-term viability in the region. These potential cumulative benefits to upland sandpipers may be overshadowed by habitat losses off the Forest, particularly as grazing land, pastures, and other grasslands revert to forested habitats.

Determination and Rationale
Implementation of the revised Forest Plan and any of the proposed alternatives may impact individual upland sandpipers, but management actions prescribed by the Plan are ***unlikely to result in a trend toward federal listing or a loss of viability on the FLNF***. This determination is based on the fact that the proposed Plan includes goals, objectives, standards, and guidelines to allocate more than 30 percent of the Forest to grassland habitats, to preserve and enhance the quality of these grassland habitats, and to plan management actions so as to minimize the likelihood of interfering with nesting and brood rearing of grassland species.

Northern Harrier

Information presented here on this species is derived from a review of the literature, which is documented in the Forest Plan revision project file referenced in the Bibliography (USFS 2003p, SVE Bird Panel 2003).

The northern harrier, also called the marsh hawk, is listed among the Regional Forester's Sensitive Species (RFSS). New York State lists the northern harrier as threatened (NYDEC 2004b).

Distribution, Status, and Trend

The Old World population of harriers is sometimes regarded as separate species, in which case the New World species is *C. hudsonius*. The South American species *C. cinereus* sometimes is considered as conspecific with this species (NatureServe 2004b).

The northern harrier occurs across all of North America except Labrador, Newfoundland, the high Arctic, and Aleutian Islands. It winters in southern British Columbia, southern Ontario, and Massachusetts, south through the middle United States and the West Indies to northern South America. In New England, harriers breed in Maine, northern New Hampshire and Vermont, as well as Nantucket and Martha's Vineyard (DeGraaf and Yamasaki 2001).

This species is in documented decline across all of its range, due primarily to habitat loss from development and old fields reverting to forests. The northern harrier was common and widespread as a breeding bird in New York State. Numbers declined dramatically during the 1950s and 1960s, and Smith (1988) considered this species an uncommon, scattered breeder in New York.

Within the United States and Canada the northern harrier it is listed as apparently secure; global and national statuses are G5 and N5B-N5N, respectively. In New York State it is ranked S3B,S3N (NYNHP 2003, NatureServe 2004b). North American Breeding Bird Survey data show that numbers of northern harriers declined significantly from 1966 to 2002 in New York State, but there is no apparent trend for the northeastern United States in general (Sauer et al. 2003). The New York Breeding Bird Atlas suggests a shift in distribution across the state, but no discernable numerical trend in nesting occurrences over the past 20 years (NYDEC 2005).

Life History and Habitat Relationships

Harriers mature at two years of age. This is one of few raptor species that nests on the ground, usually in tall, dense clumps of vegetation in dry fields, cut-over areas, or shrubby swamps (Smith 1988, DeGraaf and Yamasaki 2001). Harriers can raise one brood per year. Egg laying takes place from mid May through mid-June in Massachusetts, and late April through late June in New York. Average clutch size is five eggs, but it can be four or six, depending on abundance of voles. Incubation lasts 28 to 36 days. Older nestlings make tunnels in the vegetation near the nest, which may be used as escape routes (Serrentino 1994). Harrier young may be capable of flight at 30-35 days; juveniles stay near the nest and are dependent on parents for food for an additional three to four weeks (DeGraaf and Yamasaki 2001). The longest lifespan reported for a banded, wild harrier is 16 years (MacWhirter and Bildstein 1996).

Harriers generally arrive in northern breeding areas in March-April; southward migration in the United States and Canada takes place from August through November (NatureServe 2004b).

The northern harriers' staple diet is small mammals, particularly microtines and other small rodents. They also eat shrews, lagomorphs, small birds, amphibians, insects, and occasionally carrion (DeGraaf and Yamasaki 2001, NatureServe 2004b).

Predators include skunks, mink, raccoons, dogs, and other raptor species that prey on eggs and young. Nests can be lost when trampled by livestock, deer, or other large animals (NatureServe 2004b).

In northeastern North America, harriers typically breed in undisturbed wetland habitats, including open wetlands, wet pastures, old fields, marshes, prairies, grasslands, and riparian woodlands (Smith 1988, MacWhirter and Bildstein 1996, Herkert et al.1999, DeGraaf and Yamasaki 2001). They prefer nesting in ungrazed grasslands but can tolerate lightly grazed sites, although such nests are at risk of being trampled (Hamerstrom 1969, Toland 1986 *in* Herkert et al. 1999, MacWhirter and Bildstein 1996, SVE Bird Panel 2003). Nests or young may be lost to harvesting of early crops, haying or tilling (Craighead and Craighead 1956, Hamerstrom 1969), but nesting birds may tolerate agricultural activities in areas adjacent to nest sites (Serrentino 1992).

Home ranges vary considerably in size (400-37,000 acres, median 650 acres), depending on available food supply and habitat (MacWhirter and Bildstein 1996). Minimum area requirements were 55 ha for northern harriers

in grasslands of Illinois (Walk and Warner 1999). Females typically forage closer to the nest than males and their home ranges are usually smaller. Both sexes increase home range by factor of 2.5 or more as their chicks grow (MacWhirter and Bildstein 1996).

Limiting Factors and Threats

The northern harrier's population decline is due primarily to habitat loss from development, draining of wetlands, and old fields reverting to forests (DeGraaf and Yamasaki, 2001, NatureServe 2004b, SVE Bird Panel 2003). Drainage of Atlantic coastal marshes for mosquito control destroyed breeding and foraging habitat (Serrentino and England 1989, NatureServe 2004b).

Harrier populations negatively impacted by organochlorines with egg shell thinning, reproductive failure and death (SVE Bird Panel 2003, NatureServe 2004b).

Harriers are ground nesters so their nests, eggs, and young are vulnerable to destruction from human disturbance, particularly farming, and natural causes ((SVE Bird Panel 2003, NatureServe 2004b).

Grassland habitats generally are diminishing in availability and quality in the Allegheny Plateau and Lower Great Lakes Plain ecological regions, which cover most of central New York. Consequently, there are regional conservation and viability concerns over many grassland dependent species, including Henslow's sparrows, upland sandpipers, and northern harriers (Dettmers and Rosenberg 2003, Robertson and Rosenberg 2003).

Information Gaps

The greatest information gap relative to the northern harrier on the FLNF is its abundance and distribution on the Forest.

Management Direction Pertinent to Northern Harrier

There is no specific management direction in the revised Forest Plan for the northern harrier, however Forest-wide management direction includes significant emphasis on grassland habitats in the goals and objectives. Standards and guidelines provide direction to enhance the quality of grassland habitat and minimize the likelihood that management actions will interfere with foraging, nesting, and brood rearing of the northern harrier and other grassland species. This management direction applies under all three alternatives.

Potential Management Effects

Direct and Indirect Effects

Differences between alternatives are minimal when considering potential management effects for the northern harrier. This is a grassland species; goals, objectives, standards, and guidelines common to all alternatives allocate more than 30 percent of the Forest to grassland habitats and provide direction for maintenance and enhancement of these grassland habitats. Alternative 1 allocates slightly more area to combined Grassland for Wildlife and Grassland for Grazing (6,348 acres, 39% of the FLNF lands) than Alternatives 2 and 3 (5,938 acres, 36%), but Alternatives 2 and 3 allocate slightly more grassland (252 acres, 1.5%) to wildlife than to grazing. Nesting northern harriers can tolerate light grazing activity, but the species would benefit from a greater acreage in non-grazed grassland. However, all three alternatives provide adequate grassland habitat for northern harriers, and differences between the direct and indirect effects of the three alternatives are equivocal.

Cumulative Effects

The FLNF is not of particular importance relative to the species' overall range, but the Forest may be important to Northeastern and New York State populations (SVE Bird Panel 2003). Current trends suggest that the availability and quality of grasslands in central New York may continue to diminish in the future (Dettmers and Rosenberg 2003, Robertson and Rosenberg 2003). The cumulative effects of implementing the proposed Forest Plan under any of the three alternatives will be continued preservation, maintenance, and enhancement of suitable nesting and foraging habitat for northern harriers and other grassland species on the Forest. Long-term, sustainable management of grassland habitats would contribute to the species' long-term viability in the region. These potential cumulative benefits to northern harriers may be overshadowed by habitat losses off the Forest, particularly as grazing land, pastures, and other grasslands revert to forested habitats.

Determination and Rationale
Implementation of the revised Forest Plan and any of the proposed alternatives may impact individual northern harriers, but management actions prescribed by the Plan are ***unlikely to result in a trend toward federal listing or a loss of viability on the FLNF***. This determination is based on the fact that the proposed Plan includes goals, objectives, standards, and guidelines to allocate more than 30 percent of the Forest to grassland habitats, to preserve and enhance the quality of these grassland habitats, and to plan management actions so as to minimize the likelihood of interfering with nesting and brood rearing of grassland species.

Eastern Small-footed Bat

Information presented here on this species is derived from a review of the literature, which is documented in the Forest Plan revision project file referenced in the Bibliography (USFS 2003m, SVE Mammal Panel 2003).

The eastern small-footed bat is listed among the Regional Forester's Sensitive Species (RFSS). New York State lists the eastern small-footed bat as a Species of Special Concern (NYDEC 2004b).

Distribution, Status, and Trend
Populations of eastern small-footed bats are small and scattered, occupying an apparently discontinuous range, from the Ozark Mountains of Arkansas, Missouri and Oklahoma, through the Appalachian Mountains northward to southeastern Ontario, and the New England states (Choate et al. 1994, NatureServe 2004b, BCI 2004b). To date, the largest seemingly contiguous area occupied by the bat is mountainous areas of New York, Pennsylvania, West Virginia, and Virginia (NatureServe 2003, BCI 2004b).

The eastern small-footed bat is considered one of the rarest bats in the eastern United States (Robbins et al. 1977), although it may be locally abundant in some areas (Dalton 1987, Handley 1991). Numbers are believed to have declined in recent years, but abundance is extremely difficult to assess or predict due to lack of appropriate survey and monitoring techniques (Erdle and Hobson 2001). About 3,000 individuals are reported from 125 known hibernacula; approximately 60 percent of the world's population hibernate at two sites in New York State (NatureServe 2004b; Hicks and Butchkoski, personal communications in Erdle and Hobson 2001), a fact that makes the species particularly vulnerable. Some individual hibernacula have been lost (SVE Mammal Panel 2002, 2003).

Eastern small-footed bats are known to occur on the FLNF in summer (FLNF 2000), but data on abundance or frequency are not available. There are only two known hibernacula in New York State for this species, on Lake George and Lake Champlain, 150 to 200 miles to the east of the FLNF. This species may be using hibernacula that are inaccessible to humans, making it difficult to collect more information (SVE Mammal panel 2003). Very small numbers of eastern small-footed bats are known from a few hibernacula in Vermont and New Hampshire (SVE Mammal Panel 2002, 2003).

The eastern small-footed bat is ranked by NatureServe (2004b) as G3 globally, N3 in Canada and the United States, and S2 in New York State (NYNHP 2003).

Life History and Habitat Relationships
Detailed information on the life history and ecology of the eastern small-footed bat is available from Best and Jennings (1997), NatureServe (www.natureserve.org), Bat Conservation International (www.batcon.org), academia, and State Agencies. Very few details about the specific biology of this species are known, particularly in summer. Much of what is documented is from the southern part of the animal's range and may or may not apply in northern New England or New York (SVE Mammal Panel 2002, 2003).

Mating most likely is similar to other *Myotis* species (Wimsatt 1945); females can mate in their first year prior to entering hibernation (at age 6 months or less), and males prior to entering hibernation their second year (at age 1.5 years or less). Eastern small-footed bats produce a single young, which is born between late May and early July, depending on latitude (Barbour and Davis 1969). Young are born and reared in communal nursery colonies at maternity roosts that include as many as 20 adult females (Barbour and Davis 1969). Maternity roosts are usually chosen because they are warm or hot, which hastens development of young.

In general, bats are long-lived mammals for their size, probably between 6 and 12 years (Hitchcock 1965, Barbour and Davis 1969, Belwood 1998). Annual survival rates for females (42%) appear to be lower than those for males (76%). This may be due to greater physiological demands of reproduction on females, higher metabolic rates and longer sustained activity during summer days, and greater exposure to possible disease carrying parasites in maternity colonies (Hitchcock et al.1984).

Eastern small-footed bats generally travel fairly short distances (less 25 miles) between summer habitats and hibernation sites (Hitchcock 1965, Best and Jennings 1997, DeGraaf and Yamasaki 2001).

Eastern small-footed bats occur in or near deciduous or evergreen forest habitats, particularly in hilly and mountainous areas. Choate et al. (1994) describes this species as "saxicolous," or "rock-loving" in summer. Small summer maternity roosts have been found under rocks on hillsides and open ridges, in cracks and crevices in rocky outcrops and talus slopes, beneath the bark of dead and dying trees, and in buildings (Webb and Jones 1952, Hitchcock 1965, Tuttle 1964, Barbour and Davis 1969, Handley 1991, Whitaker and Hamilton 1999).

Males roost separately from females, although their precise locations are not known. They have been netted near the entrances to abandoned mines, caves, railroad tunnels, sandstone rock shelters, cliffs, and trees where they might form small groups or roost singly (Krutzsch 1966, MacGregor and Kiser 1999). Proximity to water may be an important factor for roosts (Erdle and Hobson 2001, SVE Mammal Panel 2003). There is no evidence to date that *M. leibii* colonizes manufactured bat houses.

Eastern small-footed bats hibernate during winter in caves and abandoned or inactive mines at a variety of elevations (Davis et al. 1965, Krutzsch 1966, Barbour and Davis 1969, Dalton 1987). Eastern small-footed bats are hardy; they are among the last species to enter hibernacula in the fall and the first to emerge in spring (Barbour and Davis 1969, Gates et al. 1984, Hitchcock et al. 1984). In Vermont and New York, they can enter hibernation as late as November and emerge as early as March. They typically winter segregated from other species, although the same hibernacula may also include southeastern bats (*M. austroriparius*), little brown bats (*M. lucifugus*), northern long-eared bats (*M. septentrionalis*), Indiana bats (*M. sodalis*), big brown bats (*Eptesicus fuscus*), and eastern pipistrelles (*Pipistrellus subflavus*) (Davis et al. 1965, Hitchcock et al. 1984, Gates et al. 1984, Dunn and Hall 1989).

Eastern small-footed bats feed on flying insects that are very small relative to their own size (Barbour and Davis 1969). Little detailed information exists on food habits but the bats have been observed to fly and forage slowly (Barbour and Davis 1969) at and below canopy height, over streams and ponds, and along cliff ledges (Choate et al. 1994). Inter- and intra-specific competition for food has been documented in insect-eating bats (Husar 1976, Belwood and Fullard 1984). The degree to which small-footed bats might compete with other sympatric bats for food, foraging areas, or other habitat requirements (e.g., roosting sites) is not known (SVE Mammal Panel 2003).

Predators are likely to include domestic and feral house cats, raccoons, owls, and snakes that feed opportunistically on bats in trees, buildings, or in cracks and crevices in rocky areas. Swarming and overwintering bats in gated caves and mines are susceptible to predators like house cats, opossums, raccoons, weasels, and wood rats (Erdle and Hobson 2001).

Small-footed bats, like all bats, are susceptible to rabies (Constantine 1979, Brass 1994). The incidence of the disease in this species has not been studied but is assumed to be as low as it is in other bats species – probably less than 1 percent (Brass 1994 and references cited therein, Belwood 1998). In New York, big brown bats and little brown bats have fallen victim to West Nile Virus (CDC 2000), which should also be capable of infecting small-footed bats. Bats have a variety of ecto- and endoparasites, as do all other mammals (SVE Mammal Panel 2003).

Limiting Factors and Threats

Habitat destruction and/or development (in rural or suburban environments and for agriculture, road construction, etc.) are likely to negatively affect bats if potential roost sites, snags, and foraging areas (including bodies of water and the insects they produce) are altered.

Range-wide, forested lands are likely important to the survival of these bats. Forested areas around cave and mine openings may be used for foraging and as roost sites before entering hibernation. More importantly, forests

near cave and mine openings are thought to stabilize humidity and temperature levels inside the cave/mine (Erdle and Hobson 2001).

Bats have very low reproductive rates, which hinders recruitment and population growth in the event that a large portion of a population is destroyed. Compared to other bat species, eastern small-footed bats have small populations that increase the risk for extirpation by random events at both winter and summer roosts.

Insecticides and other pesticides (used for agriculture and forestry), which are often applied at dusk to avoid honeybees, have been implicated in the decline of several bat species (Belwood 1998). They can kill the animals directly if bats themselves are sprayed (Belwood personal observation) or reduce food available to bats. Heavy metals and other contaminants also reduce bat populations (Belwood 1998).

Cavers and other people entering un-gated cave and mine hibernacula can cause bats to arouse and deplete the limited fat reserves necessary for survival during hibernation (Thomas 1995, Thomas et al. 1990) or can intentionally harass or destroy large numbers of hibernating bats. Bats have a low disturbance threshold and will abandon their roosts if disturbed repeatedly. Whether this concern is as serious for small-footed bats as it is for other species is uncertain since they can use smaller caves, typically hibernate alone or in small groups, and roost in cracks and under rocks instead of on cave ceilings (SVE Mammal Panel 2003). Roads leading to cave and mine sites can increase the potential for human-related disturbances at hibernacula (SVE Mammal Panel 2003).

Wind turbines used to generate electricity in some parts of the United States have been shown to cause bat mortality (Osborn at al. 1997). Wind turbines near large summer or winter bat roosts, could kill thousands of bats

Information Gaps

There is a general lack of information on this species. Radio telemetry work would help provide more information on the natural history of the species and more genetic study could provide information on whether populations are in decline (SVE Mammal Panel 2003).

Although eastern small-footed bats have been found on the FLNF, their abundance, frequency, and habitat preferences on the Forest are unknown. They typically roost on the ground, particularly under rocks, however, it is also likely that the species is using some other type of habitat on the FLNF, such as overhangs along ravines and vertical shale along the lakeshore. It is unknown if small-footed bats prefer any vegetative communities (SVE Mammal Panel 2003).

Management Direction Pertinent to Eastern Small-footed Bat

There is no specific management direction in the revised Forest Plan for the eastern small-footed bat. Forest-wide goals and objectives address conservation of RFSS in general, including maintenance or enhancement of their habitats. The greatest expanse of potentially suitable roosting habitat on the Forest is the steep, fragile, shale slope along slightly less than a mile of lakefront near Caywood Point. Caywood Point is designated as a Recreation and Education Special Area, with one set of standards and guidelines, in all alternatives. Consequently, management direction for other management areas is not applicable for this species. Cliff and steep rocky habitats are not specifically protected under revised Forest Plan standards and guidelines. However, since these cliffs occur along the edge of Seneca Lake, revised standards and guidelines associated with soil, water, and riparian area protection and restoration would apply. Protective strips of undisturbed soil are required for all soil disturbing activities adjacent to waterbodies and wetlands, and these strips increase in width as slopes increase in severity. Thus, most soil-disturbing activities at the cliffs of Caywood Point would be limited, as these cliffs are generally within 100-200 feet of the shoreline of Seneca Lake. To a much lesser degree, potential roosting habitat also may occur in rocky overhangs along wooded ravines; these areas are designated as Ecological Special Areas in each alternative. Like the Recreation and Education Special Area at Caywood Point, these Ecological Special Areas receive protection through standards and guidelines associated with soil, water, and riparian area protection and restoration rather than through specific management direction. The Recreation and Education Special Area and Ecological Special Areas are not available for timber harvest. Forest-wide standards and guidelines address retention of wildlife reserve trees (snags, den trees, and nest trees), which may be used as roosts. These standards and guidelines provide guidance for the numbers, abundance, and distribution of snags, den trees, and nest trees. This management direction applies under all three alternatives.

Potential Management Effects

Direct and Indirect Effects
Potential management effects for bats focus on three fundamental aspects of habitat requirements: winter hibernacula, summer roosting, and foraging. There are no hibernacula on or in the vicinity of the FLNF. The eastern small-footed bat has been found foraging at night on the Forest, but to date, no roosting areas have been identified. The specific details of microhabitat necessary for good roosting habitat are not known, but the region with the greatest potential for daytime roosting is the steep, rocky, slope along the lakefront near Caywood Point. Activities on the Forest that increase or encourage human access to this region could result in negative effects to roosting habitat by increasing trampling and erosion or changing microclimate, and disturbing or injuring roosting bats. Allocation of potential roosting habitats and the potential direct and indirect effects are the same in each alternative.

Bats, including eastern small-footed bats, forage for flying insects in clearings, along forest edges, over water, or under the forest canopy; activities that create or maintain such openings could provide beneficial effects for foraging. These activities include timber harvest, management and maintenance of recreational sites, construction and maintenance of roads and trails, removal of hazard trees, wildlife habitat management, prescribed burning, special uses, visual quality management, and cultural resource protection. Timber harvest or vegetation management could result in negative effects, as well. Eastern small-footed bats do roost in trees, although to a much lesser extent than in rocky areas. However, the potential for disturbance or injury to eastern small-footed bats is extremely low, considering that the species has not been documented roosting on the Forest, the number of acres in forested habitats and the number of potential roost trees on the Forest and in the region, and Forest-wide management direction that protects potential roost trees through standards and guidelines for retention of snags, nest trees, and den trees.

Cumulative Effects
The importance of the FLNF to eastern small-footed bats is unknown, but it is unlikely to be of particular importance relative to the species' overall range (SVE Mammal Panel 2003). Long-term, sustainable management that preserves rocky slopes for roosting habitat and maintains a diversity of openings and forest cover for foraging habitat would contribute to the species' long-term viability in the region.

Determination and Rationale
Implementation of the revised Forest Plan and any of the proposed alternatives could affect individual eastern small-footed bats, but management actions prescribed by the Plan are ***unlikely to result in a trend toward federal listing or a loss of viability on the FLNF***. This determination is based on the low occurrence of the species on the forest and management direction in the proposed Plan, including goals, objectives, standards, and guidelines to protect important habitat for RFSS and to retain potential roost trees.

Green Floater

The green floater, a freshwater mussel, is listed among the Regional Forester's Sensitive Species (RFSS). New York State lists the green floater as threatened (NYDEC 2004b).

Distribution, Status, and Trend
The green floater has a widespread distribution from North and South Carolina northward to the Hudson River Basin, and westward across New York State in the Mohawk River and the Erie Canal to the Genesee River and the Saint Lawrence River Basin (AMNH 2004, NatureServe 2004b, NCWRC 2004).

The green floater is known to occur in Cayuta Creek near Alpine, NY, approximately 10 miles south of current Finger Lakes National Forest ownership, but it has not been found on the Forest (FLNF 2004).

The green floater is ranked by NatureServe (2004b) as G3 globally, N3 in the United States, and S1S2 in New York State (NYNHP 2003).

Life History and Habitat Relationships
The green floater is one of a few species of freshwater mussels that is hermaphroditic (individuals contain both male and female gonadal tissues). This species, unlike some other mussels, spawns in summer and the glochidia (larvae) are retained by the adult in marsupial gill pouches until the following spring. The larvae of many fresh water mussels live as parasites on the gills of fishes, but host fish have not been identified for the green floater (Barfield and Watters 1998 cited in NCWRC 2004, Lellis and King 1998 cited in NCWRC 2004, AMNH 2004, NCWRC 2004, TNC 2004).

The green floater inhabits quiet, meandering sections of stable, small rivers and streams. It is intolerant of very strong currents and often is found in quiet pools and eddies with gravel and sand substrate. The green floater also has been found in canals (Ortmann 1919 cited in NCWRC 2004, NatureServe 2004b, AMNH 2004). In North Carolina, the best populations are associated with good to excellent water quality. (NCWRC 2004). Adults are essentially sessile, but water currents may carry them downstream. Other species of mussels disperse as larvae are carried on the gills of host fish, but this has not been demonstrated for green floaters (NCWRC 2004, TNC 2004).

Freshwater mussels may take six years to attain sexual maturity. Life spans of various species typically range from eight to 20 years, but some North American species can live as long as 30 to 80 years (Nedeau et al. 2000 cited in AMNH 2004). The green floater is a filter feeder of plankton and detritis (Nature Conservancy 2004).

The green floater and other fresh water mussels absorb heavy metals and other pollutants into soft tissue and retain it in their shells. In this way, they serve as good indicators of pollution in a waterbody, potentially over several time scales (Nature Conservancy 2004)

Limiting Factors and Threats
The green floater is vulnerable to habitat loss and degredation of habitat quality, through siltation, non-point source pollution, or introduction of exotic species, such as the Asian clam (*Corbicula*) or zebra mussel (*Dressena polymorpha*) (TNC 2004)

Information Gaps
The greatest information gaps relative to the green floater and the FLNF relate to its abundance and distribution on lands in the vicinity of the FLNF and in central New York State in general.

Management Direction Pertinent to Green Floater
The Forest Plan makes no specific provisions for management of the green floater. Suitable habitat for this species has not been identified on the Forest, however Forest-wide standards and guidelines for activities in and near riparian areas and for management of wetlands and ponds provide protection of these areas. This management direction applies under all three alternatives.

Potential Management Effects
Implementation of the revised Forest Plan, as proposed, can have no direct, indirect, or cumulative effects on the green floater because there is no suitable habitat available on the FLNF and management on FLNF does not affect the nearest known creek where this species occurs. Should the Forest acquire potentially suitable habitats in the future, the quality of these habitats will be protected, and enhanced, through adherence to established standards and guidelines.

Determination and Rationale
Because this species is not known to occur on the FLNF, and management of the FLNF will not affect populations off the Forest, implementation of the revised Forest Plan, as proposed, will have ***no effect*** on the green floater.

West Virginia White

The West Virginia white is a small, forest butterfly. Information presented here on this species is derived from a review of the literature, which is documented in the Forest Plan revision project file referenced in the Bibliography (USFS 2003t, SVE Insect Panel 2003).

The West Virginia white is listed among the Regional Forester's Sensitive Species (RFSS).

Distribution, Status, and Trend

The West Virginia white ranges from the southern Appalachians to southern New Hampshire and Vermont, with large but isolated populations in Ontario and the northern Great Lakes region (Opler 1992, USGS 2004).

Confirmed occurrences in New York State are primarily in the southern half of the state, in counties adjacent to Pennsylvania and New Jersey (USGS 2004). To date, the West Virginia white has not been found on the FLNF despite surveys specifically targeting it. It has been found nearby in Schuyler County and adjacent Tompkins County (Gregoire and Gregoire, personal communication, 2002; SVE Insect Panel 2003). Suitable habitat (oak forest) and host plants are available on FLNF, thus there is high probability that this species will occur on the FLNF (SVE Insect Panel 2003).

The FLNF and the FL region are not important to the species' overall distribution. If it were found in FLNF, it would be important locally and statewide because it is an indicator of healthy woodlands.

The West Virginia white is ranked by NatureServe (2004b) as G3G4 globally, N2N3 in Canada, N3N4 in the United States, and SU in New York State (NYNHP 2003). There is a suspected decline in Vermont, but this species might be increasing across southern New England (SVE Insect Panel 2003).

Life History and Habitat Relationships

The West Virginia white is univoltine; it completes its lifecycle and produces a single generation per year. Adults fly from late April to mid-June. Females lay eggs 1 at a time on underside of plant (lay one per plant and then move to another plant. Larvae finish feeding by early-mid summer and then diapause as pupae until the spring (Opler and Krizek 1984, SVE Insect Panel 2003, NatureServe 2004b).

The West Virginia white was confused with the eastern veined white (*Pieris napi oleracea*) for some time, and apparently mating does take place between individuals of the two species occasionally (Chew 1980).

Larvae feed on toothworts [*Cardamine* (=*Dentaria*) *diphylla* and *C*. *concatenata* (=*D. laciniata*)]; adults probably act as pollinators to some extent when they obtain nectar from toothworts, violets, spring beauty, and other plants (Opler and Krizek 1984, USGS 2004). An introduced plant species from Europe, the garlic mustard (*Alliaria officinalis*), has developed into a problem in that it attracts females to oviposit, but the larvae cannot successfully mature on this species (Porter 1994, USGS 2004, NatureServe 2004b).

The West Virginia white is found in relatively undisturbed, mature, moist deciduous woodland or mixed woods, often with maple or beech present, in hardwood swamps, and occasionally in riparian woodlands (Opler and Krizek 1984, USGS 2004, NatureServe 2004b). Preferred stands include trees at least 15-16 inch DBH, and often with a well developed high shrub layer including species like witch hazel, maple leaf, vibernum, ironwood, and blue beech (SVE Insect Panel 2003). These preferred habitats typically have a well-established beech/maple leaf litter layer. *Cardamine diphyla* must be present; it is the larvae host plant. Butterflies lay eggs on cutleaf toothwort (*Cardamine concatenata*), a spring ephemeral that dies by June. A major nectar source is spring beauty (*Claytonia* spp.), another spring ephemeral. Thus, the entire life history of the butterfly is compressed into 12-14 days, dictated by the life cycle of these plants (SVE Insect Panel 2003).

The West Virginia white requires a closed canopy and forest connectivity because it does not like to cross openings. Butterfly will cross roads and streams if contiguous forest is present, but they can become a barrier to movement if the canopy is open. Adults observed out of the forest probably are females that are dispersing or looking for sunny patches late in the flying season (SVE Insect Panel 2003).

Limiting Factors and Threats

The West Virginia white is susceptible to a variety of larval parasites, particularly wasps and flies.

The West Virginia white is thought to have disappeared from one of the reserves at Cornell University, possibly due to aerial spraying for gypsy moths.

This species is dependent on particular species of host plants for its survival. Any factor affecting the abundance or distribution of these plants will have repercussions on West Virginia whites. Spread of the invasive species garlic mustard (*Alliaria officinalis*) represents a threat to larval survival.

Fragmentation of mature forest due to development and timber harvest represents a potential threat to movement of adult butterflies.

Early-emerging adults may be at risk from unseasonably late freezing conditions.

Information Gaps
The greatest information gap relative to the West Virginia white on the FLNF is its abundance and distribution on the Forest.

Management Direction Pertinent to West Virginia White
There is no species-specific management direction in the revised Forest Plan for the West Virginia white. Forest-wide goals, objectives, standards, and guidelines that conserve RFSS in general, as well as agency policy, apply to this species. Additionally, Forest-wide direction that addresses introduction prevention, containment, and abatement of non-native invasive species on the Forest is relevant to the West Virginia white because of the threat represented by the invasive species garlic mustard. This management direction applies under all three alternatives.

Potential Management Effects

Direct and Indirect Effects
The quantity and quality of habitat for the West Virginia white is likely to remain stable across the Forest under each of the three alternatives. This species occurs in forest habitats with a closed canopy. On the FLNF, this potentially includes lands allocated to predominantly forested MAs: Northern Hardwood, Oak Hickory, and Future Old Forest. These MAs combined will include similar acreage under Alternative 1 (7,169 acres, 43.6% of the Forest), Alternative 2 (7,995 acres, 48.6%), and Alternative 3 (7,623 acres, 46.4%). Smaller acreages of suitable habitat also will be included in the various Special Areas or existing and candidate Research Natural Areas.

Temporary openings created through timber harvest, vegetation management, or other management activities would make particular areas unsuitable to West Virginia whites and likely would create barriers to movement of individual butterflies. Timber harvest will not occur and vegetation management will be minimal in the Future Old Forest MA. No land is allocated to this MA in Alternative 1, but Alternative 2 includes 3,821 acres (23%) and Alternative 3 includes 1,118 acres (7%). Allocation of land to the Future Old Forest MA would create large areas of continuous forest canopy; however, the level of vegetation management that might occur in the Northern Hardwood and Oak Hickory MAs would not represent a threat to habitat for the West Virginia white. All three alternatives provide adequate closed-canopy habitat, and differences between the direct and indirect effects of the three alternatives are equivocal.

Cumulative Effects
The FLNF and the FL region are not of particular importance relative to the species' overall range; however, the Forest may be important to Northeastern and New York State populations (SVE Insect Panel 2003). The cumulative effects of implementing the proposed Forest Plan under any of the three alternatives would be continued preservation, maintenance, and enhancement of suitable habitat for the West Virginia white. Long-term, sustainable management of forested MAs would contribute to the species' long-term viability in the region.

Determination and Rationale
Implementation of the revised Forest Plan and any of the proposed alternatives may impact individual West Virginia white butterflies, but management actions prescribed by the Plan are ***unlikely to result in a trend toward federal listing or a loss of viability on the FLNF***. This determination is based on the fact that the proposed alternatives to the Plan allocate approximately 44 to 49 percent of the Forest to predominantly forested MAs. These management prescriptions would include abundant closed-canopy habitat suitable for the West Virginia white.

Wild Onion

Information presented here on this species is derived from reviews of the literature and discussions with botanists. These reviews are documented in the Forest Plan revision project file and are referenced in the Bibliography (USFS 2004a, USFS 2003a, SVE Monocot Panel 2003).

Distribution, Status, and Trend

Allium cernuum is distributed throughout much of North America, with the exception of New England and northeastern Canada. Within the Finger Lakes region of New York, it is extant in Chemung, Cayuga, and Schuyler Counties, and historical in Erie, Steuben, and Tioga Counties. There are two extant populations in Schuyler County that are large and are relatively near the FLNF. The species is not known from the FLNF presently or historically, but is considered likely to be there by a panel of experts (SVE Monocot Panel 2003). The most likely habitat for it on the FLNF is a small area of cliffs along Seneca Lake at Caywood Point.

The plant is currently ranked by NatureServe (2004a) as G5 globally and N5 in the United States. It is ranked by the New York Natural Heritage Program (NYNHP) as S2, and is listed by New York as Threatened (Young and Weldy 2004). The species does not appear to be declining across its range, but in New York there may be a decline as plants occurring in several historical sites have not been relocated.

Life History and Habitat Relationships

Wild onion is a perennial plant that has a flowering and fruiting season in the Finger Lakes region limited to July and August. Ants may be involved in dispersal, and the seeds need exposure to light in order to germinate. Within the Finger Lakes region, its habitat is narrowly defined as steep, rocky or cliffy places such as shale cliff and talus slopes. It generally occurs in fairly open places that are hot in the afternoon, and where there is little to no understory competition, generally at less than 1,500 feet in elevation, in thin, dry, usually limy and rocky soil. Surrounding forests are generally Appalachian oak-hickory and oak-pine communities.

Limiting Factors and Threats

The amount, size, and distribution of habitat are key limiting factors for this species on the FLNF. Botanists knowledgeable of this species suggest that any population likely to be found on the FLNF would be small and isolated due to habitat constraints. Cliff habitat is very limited on the Forest, being restricted on National Forest System lands to about 10-20 acres at Caywood Point. These cliffs continue north and south of the Forest along the shore of Seneca Lake but are under private ownership. Other steep rocky areas in ravines on the Forest are less likely habitat because they tend to be shaded. Consequently, the limited availability of suitable habitat on the FLNF cannot be controlled or adjusted by Forest management direction or activities, as a practical matter, except through purchase of additional habitat.

Trampling, future road improvements, NNIS, and herbicide treatment have been listed as threats to specific populations, but none are viewed as an extensive threat to the species across its range at this time. Activities that the Forest could undertake that may affect habitat or species include removal of vegetation within or adjacent to the species' habitat, and increasing access to habitat.

Information Gaps

Little is known about this species' pollinators, the importance of ants as dispersers, or why its habitat is restricted to cliffs and rocks in the Finger Lakes region while it is more widespread in open ground elsewhere. Fire may have played a role in maintaining its habitat in the Finger Lakes region, but its role is unclear at this time.

Management Direction Pertinent to Wild Onion

Forest-wide goals, objectives, standards, and guidelines that conserve RFSS in general, as well as agency policy, apply to this species. There is no species-specific management direction in the revised Forest Plan for this species. For this effects analysis, it is assumed that the species is present within the only likely suitable habitat on the Forest, along the cliffs at Caywood Point. Caywood Point is designated as a Recreational and Education Special Area, with one set of standards and guidelines, in all alternatives. Consequently, management direction for other management areas is not applicable for this species. Cliff and steep rocky habitats, which generally have slopes of greater than 25%, are protected under revised Forest Plan standards and guidelines for erosive soils. Since these cliffs occur along the edge of Seneca Lake, revised standards and guidelines associated with soil, water, and riparian area protection and restoration would also apply. Protective strips of undisturbed soil are required for all soil disturbing activities adjacent to waterbodies and wetlands, and these strips increase in width

as slopes increase in severity. Thus, most soil-disturbing activities at the cliffs of Caywood Point would be limited, as these cliffs are generally within 100-200 feet of the shoreline of Seneca Lake.

Potential Management Effects

Direct and Indirect Effects
Potential management effects do not vary by alternative for this species, as all alternatives have the same applicable management direction. The Caywood Point Special Area is not within lands considered suitable for timber harvesting, motorized trail uses, surface development of minerals, or development of wind power or communication sites. Management activities are limited to those that contribute to or otherwise protect the recreational, educational, historical, and cultural values of the area. Activities that could affect wild onion directly or indirectly would occur on or adjacent to the cliffs, and could include trail development, and limited vegetation management mainly to maintain wildlife habitat, vegetative diversity, or to create or maintain vistas. Agency policy would require avoidance of populations or a plan to minimize impacts during implementation of such activities.

It is likely that the amount of wild onion habitat would remain stable under all alternatives. New cliffs and rocky ledges will not be created except through natural processes like rockslides, and the western exposure and shale rocks of the cliffs will likely perpetuate their open condition for quite some time. The quality of habitat for wild onion would remain stable or decline slightly over the planning period. Construction of trails or stairs down the cliffs to Seneca Lake could occur, but would be very limited by erosive soil and protective strip standards. Improved access to the cliffs via trails may encourage people to climb down or along them, increasing the chances of trampling or otherwise disrupting populations and habitat along the cliffs. Damage by such recreational use is a potential threat; however shale cliffs generally provide poor climbing opportunities, and any use that threatens populations on the cliffs can lead to closure orders if needed.

Clearing vegetation along cliffs and steep rocky slopes could make habitat more suitable for wild onion by providing needed sunlight. However, it can also improve habitat conditions for NNIS. Although NNIS are already present in most of the Forest and are likely in these habitats, improved access to the cliffs via trails and vistas can also increase their extent. NNIS can compete effectively with wild onion because this species does not do well in shade, and NNIS are generally opportunistic and take quick advantage of open sunny areas. Removal of NNIS may help to improve habitat, but these sites are natural places for opportunistic species, and there will likely always be competition between NNIS and rare species in these areas.

The status of wild onion populations will likely remain stable as well across the alternatives. The limited, isolated habitat and lack of existing populations indicate that the species is not well distributed in the planning area now, is not likely to be in the future, and so will remain of viability concern. Consequently, protections afforded the species will likely mitigate or avoid direct and indirect negative impacts.

Cumulative Effects
The FLNF supplies an extremely small proportion of the available habitat for wild onion in the Finger Lakes region. However, most of this habitat in the region is not protected for rare plants, and the overall ownership pattern in the Finger Lakes region is fragmented. Consequently, botanists knowledgeable about this species agreed that any occurrences found on the FLNF would be an important contribution to the regional and New York range of this species. While the species does not appear to be of viability concern across its range, all of the information gathered on this species indicates that the risks to this species' viability on the FLNF are high under all of the alternatives, based on the natural isolation and limited quantity of its habitat on the Forest, and the lack of current populations on the Forest. Management activities on or off the Forest are not likely to contribute to an improvement in these risks, as natural geologic processes control habitat quantity.

Determination and Rationale
Implementation of the revised Forest Plan and its alternatives may impact individuals of wild onion, but are **not *likely to result in a trend toward federal listing or a loss of viability on the FLNF***. This determination is based on the fact that most of the viability issues with this species are associated with the limited availability of open, sunny, shale cliff habitat on the Forest. The availability of this habitat is generally outside of the control of Forest management direction or actions. Given the limits placed on management actions in these particular cliff habitats due to soil, water and riparian protection standards, as well as NNIS prevention standards and guidelines, loss of viability is unlikely to be a result of management actions but rather of the limited availability of

suitable habitat. The species appears to be secure globally and nationally, and not ranked in many states, so any of the limited actions that the FLNF could undertake at Caywood near the cliffs would be highly unlikely to lead toward federal listing over the planning period.

Wild Indigo

Information presented here on this species is derived from reviews of the literature and discussions with botanists. These reviews are documented in the Forest Plan revision project file and are referenced in the Bibliography (USFS 2003b, USFS 2003c, SVE Dicot Panel 2003).

Distribution, Status, and Trend

Wild indigo grows from southern Maine south to Georgia and Tennessee, west to Ontario, Michigan, Illinois, and Indiana. Most of the occurrences in NY are in the eastern part of the state, with a few occurrences separated by large distances in the north and west. The populations in the Finger Lakes region are examples of these disjunct populations. Wild indigo is known to occur on the FLNF in the South Burnt Hill area. Local botanists consider suitable habitat for the species to be limited to the vicinity of the current population, and consider suitable habitat to be quite limited in the region. There is an historical record from Junius in Seneca County.

Wild indigo is ranked G5 globally and N4N5 across the United States (NatureServe 2004a). Wild indigo is generally considered secure across its range and in New York, and it is not tracked by the NYNHP (Young and Weldy 2004). It may be declining in some locations because of loss of habitat, fire suppression, or collection for medicinal uses. The species is very rare in the Cayuga Lake Basin. Botanists knowledgeable of the species and the area did not consider occurrences of this species on the FLNF to have significance to the species' overall status or range in the state (SVE Dicot Panel 2003).

Life History and Habitat Relationships

Wild indigo is an herbaceous perennial legume that spreads by woody rhizomes and fixes nitrogen in the soil by way of associations with bacteria in the soil. It blooms in July and August, producing thousands of flowers, which each produce around five seeds. At the end of the fall, plants can break off at ground level and roll around, dispersing seeds. Seeds need soil disturbance or fire to germinate, but are viable for many years. The seeds can remain in the soil, forming a bank of seeds ready to germinate with the next disturbance. The species will have good and poor recruitment years, although it is unclear for this species how often good recruitment years occur.

Wild indigo is found on dry, acidic, sandy soil, including sand plains, pine barrens, and roadsides. It prefers full sun, though it can tolerate some shade and may grow at the edges of woods or shrub lands; in the Finger Lakes region, it will occur only in the driest woods on thin acidic soils over this acidic glacial till. There is some evidence to suggest that populations have been lost from more fertile open sites as they have been converted to agriculture or development, and that the species in these areas is now restricted to only the poorer sites. The site where it is found on the FLNF is one of the driest examples of Appalachian oak-hickory woods on the Forest.

Limiting Factors and Threats

Key limiting factors for wild indigo on the FLNF include the isolation of a single disjunct population, the limited availability of suitable habitat, and the loss of fire as a disturbance factor in the area. Botanists knowledgeable of the species and its habitat in the area considered the single population on the FLNF to be of viability concern, because it is the only extant population within the region. Only one other historical population is known from the region, and it has not been relocated. While it is known to occur on roadsides and in open areas across its range, it appears to be restricted in the FLNF area to very dry oak woods. Based on available data, the panel of botanists felt that the general area in which it currently occurs is the only likely suitable habitat available. The FLNF is limited in its ability to change the availability of habitat or make the population less isolated. The reason the habitat is suitable is due to very thin, rocky, acid soils with a mix of oak, hickory, and pine in the forest. These conditions may be difficult to replicate elsewhere on the Forest.

Factors that management of the FLNF can affect are primarily the level and type of disturbance that influences seed germination. Management activities can disturb the soil through timber harvesting, other vegetation management, and trail construction activities; these activities can also open up the canopy to introduce more light.

Use of fire through prescribed burning can also facilitate germination, and is the disturbance to which the species most effectively responds. Several of these activities have the added risk of being conducive to the spread of NNIS. Botanists who have visited the site on the FLNF suggest it is dry enough that succession to more mesic forest conditions would take a very long time, and the population is likely to persist for some time to come without intervention. They also suggest that NNIS do not appear to be a threat to the species at the moment.

Information Gaps

The primary gap in our knowledge is understanding what specific site characteristics support the population on the FLNF, and what type of disturbance regime or recruitment mechanism would maintain the current FLNF population.

Management Direction Pertinent to Wild Indigo

Forest-wide goals, objectives, standards, and guidelines that conserve RFSS in general, as well as agency policy, apply to this species. There is no species-specific management direction in the revised Forest Plan for this species. For this effects analysis, the area of analysis is considered to be the only suitable habitat on the Forest, which occurs along the southeastern slopes of Burnt Hill at the southern end of the FLNF. In all alternatives, portions of this slope are assigned to the candidate Research Natural Area (cRNA) management area designation, and so the emphasis, desired future condition, standards, and guidelines for that management area would also apply. The emphasis of this management area is to provide research opportunities and protection of high quality examples of forest types and unique natural communities across the United States. The direction for this management area essentially limits most activities that can be undertaken except those needed to support research. Management to protect and ensure the continued existence of TES species and fire-adapted ecosystems is allowed in these areas, as long as those values are part of the reason the area was designated. In alternative 1, a small portion of the area is managed for oak-hickory forest and other shade-intolerant species. There are no specific restrictions on management activities in this management area, and so forest wide direction applies here.

Potential Management Effects

Direct and Indirect Effects

In all alternatives, all or a substantial majority of the most suitable habitat for wild indigo in the southeastern portion of Burnt Hill is placed in the Hector Oak Woods cRNA. Within this designation, potential management effects do not vary by alternative for this species, as all alternatives have the same applicable management direction. The Hector Oak Woods cRNA is not within lands considered suitable for timber harvesting, motorized trail uses, surface development of minerals, or development of wind power or communication sites. Management activities are limited to those that contribute to or otherwise protect the Appalachian oak-hickory forest and rare plant values of the area for research purposes. Such activities would be designed specifically to enhance the habitat for and population size of wild indigo in the area through prescribed fire, vegetation management, or scarification, as needed. Research activities can have direct effects on the population mainly through trampling, although research in these areas is meant to be non-manipulative. The potential effects of trampling by researchers are expected to be minor and even less likely than the trampling by hikers walking through the area. There is the potential that management activities designed to improve conditions for wild indigo could have unintended negative consequences. Therefore, these activities would be experimental in nature and would need to be carefully monitored. This type of monitoring is built into the monitoring chapter of the revised Forest Plan.

The amount of habitat available for this species is expected to remain stable. Even in alternative 1 where a portion of the habitat would be managed for oak-hickory forests, this management is likely to continue to create suitable habitat for colonization opportunities, including soil disturbance and possibly prescribed fire. Within the Hector Oak Woods cRNA, this habitat will very slowly develop older characteristics, and so in 20 years will not look that much different than it does today. Management of the habitat as a cRNA will ensure that the habitat needed to support the wild indigo population there will continue to be available.

Habitat quality is also likely to remain stable over the next 20 years, because site conditions support this kind of habitat, and cRNA management will maintain these conditions. Over the much longer term, portions of the cRNA may become less suitable as the site develops a deeper canopy with greater structure. The drier portions of the site where the wild indigo is currently found are likely to stay suitable for much longer, and may require little intervention to maintain the habitat characteristics needed to support this species.

The wild indigo population at this site requires disturbance not only to create suitable habitat, but also to break the seed coat of its seeds. Fire has historically been the most effective tool for this. Use of prescribed fire is allowed in cRNAs to support their values, and so would be allowed in the Hector Oak Woods cRNA for this purpose. Consequently, the population of this species is likely to persist and remain stable. Botanists knowledgeable of the species note that population size can shift from year to year, but over time these fluctuations are less important than the proven ability of this species to respond to favorable conditions through its seedbank. Although the single isolated population leads to viability concerns on the FLNF, management actions are not likely to have direct or indirect effects that worsen or improve its viability, given the limits of available habitat. Even if actions were to expand the population size to a level much larger than at present, it won't change the fact that no other populations exist anywhere near this one, and so the gene pool for the species here may slowly shrink.

Cumulative Effects

The FLNF appears to currently supply the only suitable habitat for the species in the Finger Lakes region, as the species is only known currently in this area from the Forest. Of course, there is a fair amount of dry rocky oak woods habitat across the region, and it is uncertain why the species is not found in these areas. It may be under-reported. As indicated by the literature and botanists, the greatest threat to this species is loss or degradation of habitat. Protection of this habitat on the FLNF consequently provides some insurance that the species will persist in the region, although its distribution in western New York is limited. Information gathered on this species indicates that it is not of viability concern across its range. Over the very long term, it is possible that habitat within the cRNA will become less suitable due to natural forest development, and the habitat in the region will continue to be fragmented and developed, leading to an overall decline in the habitat quality and quantity in the region. Since populations in western and central New York are quite separate from the main portion of the species' range, there is also the possibility that the population on the FLNF will decline and be lost as its reproductive potential declines. Even so, the species is not likely to decline across its range to the extent that it will lose viability in New York, given the security of the bulk of the populations in the state.

Determination and Rationale

Implementation of the revised Forest Plan and its alternatives may impact individuals of wild indigo, but are ***not likely to result in a trend toward federal listing or a loss of viability on the FLNF***. This determination is based on the fact that most of the viability issues with this species are associated with the limited availability of very dry oak woods habitat on the Forest. The availability of this habitat is generally outside of the control of Forest management direction or actions, although its quality can be influenced by the Forest's actions. Given that the purpose of any management action in the species' habitat on the Forest would be to maintain or enhance habitat for this species, any loss of viability is unlikely to be a result of management actions but rather of the limited suitability of the habitat or the limited reproductive potential of the population. Individuals may be impacted by efforts to enhance habitat suitability, but these efforts would be experimental and well monitored and are not likely to affect its continued existence at the site. The species appears to be secure globally and nationally, and not ranked in many states, so any of the limited actions that the FLNF could undertake in its habitat would be highly unlikely to lead toward federal listing over the planning period.

Butternut

Information presented here on this species is derived from reviews of the literature and discussions with botanists. These reviews are documented in the Forest Plan revision project file and are referenced in the Bibliography (USFS 2003d, USFS 2003e, SVE Dicot Panel 2003).

Distribution, Status, and Trend

Butternut is native to North America and occurs throughout southeastern Canada and central and eastern United States. It occurs in most counties within New York, and is reported from 72 locations distributed across most of the FLNF, although some of these sites may have been planted by settlers and farmers. Because it is such a wide-ranging species, neither the FLNF nor the Finger Lakes Highlands (Reschke 1990) are critical to its distribution.

Butternut is ranked as G3G4 for North America and N3N4 the United States. While butternut is widespread in North America, its abundance and condition are both in rapid decline due to butternut canker disease, for which there is no cure. While data specific to smaller geographic areas, such as the FLNF or Finger Lakes Highlands, is

not available, there is no reason to believe that trends there are any different than elsewhere. Across its range and on the FLNF, where it is extant, it is currently doing moderately well. However, its decline due to disease is expected to continue over the next 20 years, and the information gathered on this species strongly suggests that it may lose viability on the Forest as well as throughout its range due to the disease.

Life History and Habitat Relationships

Butternut is a tree with imperfect flowers that are wind pollinated. Male and female flowers mature at different times in late May to ensure outcrossing. It does not reproduce vegetatively, but stumps of young butternuts and saplings are capable of sprouting. Trees begin to bear fruit at about age 20, and good seed crops occur every two to three years, with fruits produced in late summer through November. Seeds are intolerant of water loss and low temperatures. Squirrels, other small rodents, and gravity disperse seeds, although not very far. Seeds may be transported by water during flood events. People, especially Native Americans and early settlers, have also dispersed butternut. Germination is usually in the following spring, although the seeds can remain dormant longer. Butternut requires sufficient sunlight to germinate and grow to maturity. Seedlings are shade intolerant and require openings at least two to three times the height of the dominant overstory to establish. Once established, butternut requires room to grow to occupy the overstory. Seedling growth rate is initially vigorous. Butternut is a relatively short-lived tree, with an average lifespan of 75 years. Trees are neither fire-resistant nor fire tolerant. Butternut produces an allelopathic chemical that can be toxic to some plant species, although it does not appear to have the same lethal effect as its relative black walnut.

Butternut is extremely susceptible to a canker fungus, *Sirococcus clavigignenti-juglandacearum*, which has spread throughout butternut's range in a short time and kills mature, immature, and seedling plants. The butternut canker is extremely virulent, lacks genetic diversity, moves rapidly, and may be an exotic species. Infection results in cankers on branches, stems, and buttress roots, and can even happen in roots and fruits. If cankers coalesce or large ones form, girdling can occur, killing a branch or ultimately the whole tree. Symptoms include crown dieback, decay, root rot, and damage by woodborers. Rain, wind, insects, and birds spread the fungus. Seedlings show symptoms within two weeks of infection. The highest rates of infection occur during the late summer rainy period when dispersal of *Sirococcus* spores is optimal and fresh leaf scars provide a pathway for infection. Although the disease is lethal, cankers close to 40 years old have been found on mature trees; a young seedling, however, can succumb to the disease within weeks of infection. Infected trees do produce seeds, but they rarely germinate, further lessening survival rates. Because butternut is the major host for the disease, trees in isolated patches may be able to remain disease-free. However the canker-causing fungus can continue to colonize and produce spores on dead trees for at least 20 months after the tree dies.

Across its range, butternut does best on rich moist soil, generally in rich deciduous woods of river terraces and valleys, and also on dry rocky slopes. Within the Cayuga Lake Basin in NY, it is found in rich, usually somewhat calcareous, soils on either lowlands or hillsides, commonly in ravines, and sometimes at the base of a talus slope, often near small streams. It can be found in more open areas in riparian zones. In bottomlands and floodplains, it prefers rich, moist, well-drained soils (especially loams), and is seldom found on dry, compact, or infertile soils; however it can also occur on well-drained gravelly sites, especially of limestone origin. Canopy openings are required in order for seedlings to become established. These conditions may occur in openings, near edges, in both young forests and large gaps of older forests, as well as in riparian areas.

Limiting Factors and Threats

Butternut canker is the most serious and urgent threat to this species. The combination of the canker with the tree's relatively short life span, lack of suitable conditions for regeneration, consumption of seed by animals, and timber harvesting have collectively caused the dramatic decline in the number of butternuts range-wide. Salvage cutting in attempt to get full value for trees before they become diseased reduces the pool of potentially disease resistant individuals. Lack of natural or human-produced disturbance regimes, which create openings with soil disturbance needed by this shade-intolerant species to successfully reproduce and establish new individuals, can lead to reductions in seedling establishment. The lifespan of the tree, consumption of seed by animals, and the virulence of the canker are not affected by FLNF management actions.

Information Gaps

A review of the literature and discussions with botanists indicate that causes for the lack of germination and absence of seedlings need further investigation.

Management Direction Pertinent to Butternut

Forest-wide goals, objectives, standards, and guidelines that conserve RFSS in general, as well as agency policy, apply to this species. There is no species-specific management direction in the revised Forest Plan for this species. Because this species is widespread across the Forest, it occurs in all of the management areas, and so all of the direction applicable to these areas applies to this species as well. Since butternut tends to occur frequently in bottomlands, floodplains, and riparian zones, revised standards and guidelines associated with soil, water, and riparian area protection and restoration would also apply. Protective strips of undisturbed soil are required for all soil disturbing activities adjacent to waterbodies and wetlands, and these strips increase in width as slopes increase in severity.

Potential Management Effects

Direct and Indirect Effects

The quantity and quality of the species' natural habitat is likely to remain stable across the Forest under any of the alternatives. Given that the species benefits from harvesting near seed-bearing trees, but also can occupy old growth forests by establishing in natural gaps and growing through the canopy to become a super canopy tree, it is unlikely that any alternative will eliminate suitable habitat for butternut at a landscape scale. However, since butternut was planted at old farmsteads, and as pioneer and second growth forests on farmland age, butternut may be succeeded by more vigorous, longer-lived, shade-tolerant species on sites that aren't suitable habitat for the butternut. Consequently, the overall extent of current butternut on the FLNF may decline slightly.

Because the biggest threat to this species is the butternut canker, there is no measurable difference in effects between the alternatives. Most, if not all, of the known butternut occurrences are within management areas that would allow habitat manipulation for timber harvest or to improve TES species habitat. Butternut is relatively easy to identify, and seedlings generally occur nearby the parent tree, either through seed falling directly to the ground or perhaps carried a short distance by squirrels. Therefore, there is little chance that management actions would overlook individuals and negatively impact this species. Individuals that obviously have the disease and are of poor vigor may be harvested, but individuals with little disease or with signs of resistance would be retained in the hope that some disease resistance may be present in those individuals. Implementation of soil, water, and riparian area protections will further aid in protecting habitat for the species in riparian zones. Over the next 20 years, individual butternut trees will likely succumb to the butternut canker or old age, but there is nothing that can be done currently to mitigate that.

Cumulative Effects

Given the widespread nature of butternut's distribution, the FLNF occupies a very small proportion of the suitable and available habitat for the species in the Finger Lakes region and in New York. Fragmentation of the landscape, development, and alteration of natural river systems and riparian corridors can all contribute to loss of habitat and individual butternut trees. While the FLNF contributes to habitat stability for the species, the virulence of the butternut canker is such that this contribution will do little to nothing to help species viability over the long-term. Efforts are underway to identify individual butternut trees that are naturally resistant to the canker, in the hopes that progeny of these individuals can be restocked into areas where butternut has been extirpated. The FLNF is one place where this restocking would happen. However, it will likely take decades to produce enough resistant seed to initiate such action. However, based on the best available information and discussions with scientists, it is likely that the disease alone will lead to a loss of viability on the FLNF.

Determination and Rationale

Implementation of the revised Forest Plan and its alternatives may impact individuals of butternut, but is ***not likely to result in a trend toward federal listing or a loss of viability on the FLNF***. The primary significant threat to this species is from a disease that cannot be prevented through management direction or actions on the FLNF. Loss of viability is likely over the next 20 years as a result of this disease, and this trend may lead to federal listing. However, management actions directed by the revised Forest Plan and agency policy will protect riparian and RFSS habitat and individuals. Depending on the management area designation, individual trees with disease and poor vigor may be cut, but trees with signs of resistance would be left within harvested stands to contribute resistance to the gene pool.

Water-marigold

Information presented here on this species is derived from reviews of the literature and discussions with botanists. These reviews are documented in the Forest Plan revision project file and are referenced in the Bibliography (USFS 2003f, USFS 2003g, SVE Wet Habitat Panel 2003).

Distribution, Status, and Trend

Water-marigold is endemic to North America, and occurs primarily in glaciated regions, although it is disjunct in the Northwest. It occurs from Quebec to British Columbia (except Alberta), south to New Jersey, Missouri, and Oregon, excluding some of the Midwest. In New York, it is distributed widely, and is known from Seneca and Schuyler Counties, as well as some of the neighboring counties. It is not currently known, nor has it been historically known, from the FLNF. However, botanists knowledgeable about the species and habitat in the Finger Lakes region suggest that the species is likely to occur on the Forest adjacent to Caywood Point in Seneca Lake. An occurrence in Seneca Lake or other lakes in the Finger Lakes Highlands would be important to this species' distribution.

Water-marigold is ranked G4G5T4 in North America and N3N4 in the United States (NatureServe 2004a). It is ranked by the NYNHP as S3, and is listed by New York as Threatened (Young and Weldy 2004). It appears to be declining throughout much of its range in North America. This species was common in old 19th century millponds, most of which have disappeared at this point. A large number of the records for the species in New York are historical, and it is considered rare and not seen recently in the Cayuga Lake basin. However, when not in bloom, water-marigold resembles other species of milfoil or aquatic buttercups, and may be under-reported.

Life History and Habitat Relationships

Water-marigold is a perennial, sexually reproducing plant with perfect flowers, and fruits that rarely mature. In New York, it flowers from the end of July through mid September, and fruits from mid September through mid October. This plant produces winter buds, which function both in dispersal and as a means of overwintering. Rhizomes, which are often vigorous and well rooted in shallower areas, are often poorly developed and prone to disintegration late in the growing season in deeper areas. In a population of water-marigold that has winter buds, colonization of new parts of a lake can occur quickly. They are important for its viability.

Water-marigold is a plant of lakes, ponds, coastal marshes, marsh headwater streams, and slow streams and rivers. Lakes and ponds may be glacial in origin, and water is often calcareous. The water tends to be oligotrophic, dimictic, clear, and with circumneutral to alkaline pH, although sometimes it is more acidic. Substrates in which it roots include sand, silt, muck, peat, marl, or vegetative debris. The plant generally occurs in water depths of six feet to 20 feet, and can occur in up to 40 feet of water in extreme cases. In central NY, millponds once provided good habitat. Fluctuations in water level may be important for seedling establishment.

Limiting Factors and Threats

The primary factor limiting water-marigold on the FLNF is the availability of suitable habitat. The portion of Seneca Lake at Caywood Point appears to be the only suitable habitat available on the Forest. There are existing uses at the site that can reduce habitat quality. These include motorized access to the waterfront, which can introduce weeds if people are launching boats, and recreational use, which can increase sedimentation along the shorelines. Management direction and activities on the FLNF can influence some of species' limiting factors, in particular water quality of Seneca Lake adjacent to Caywood Point, construction of docks and landings, and control and prevention of NNIS. Discussions with local botanists suggest that construction of a dock or boat landing could increase boat traffic, making the area unsuitable for water-marigold.

While there are no natural waterbodies or slow streams or rivers on the Forest aside from Seneca Lake, there are numerous ponds on the Forest, all of which are man-made, averaging from 0.5-1.0 acre in size. Forty-six of these ponds are stock ponds created in pastures, and 27 are wildlife ponds scattered throughout the rest of the Forest. All of these artificial ponds have to be dredged periodically in order to maintain enough water to support fish or to support the water needs of cattle. Impoundment structures, which are all earthen dams, also need to be maintained regularly by removing woody vegetation. There is no way to maintain these ponds without dredging and impoundment maintenance, as these ponds are simply holes in the ground and are not associated with springs or other sources of permanent year-round water. Without the dredging and impoundment maintenance, the ponds fill with aquatic plants, oxygen is depleted, the ponds eutrophy, and the dams eventually give way, leaving no standing water. In addition, all of the ponds tend to have high levels of nutrients, as most are in areas

that are or were once agricultural lands. The substrates are almost uniformly clay. Considering all of these factors, it is unlikely that these ponds will ever provide suitable habitat for this species. Consequently, they are not considered further in this analysis.

Key factors that can limit habitat quality or otherwise threaten water-marigold are NNIS, including grass carp, and the sonar that is used to kill Eurasian water-milfoil, an NNIS. A number of additional threats include declines in water quality (including excessive nutrient loading and sedimentation) and an increase in boating activity. Grass carp consumes aquatic vegetation and have been used to keep ponds and lakes clear of the large aquatic plants called macrophytes that can cover the water and choke ponds. Other NNIS can competitively exclude this species, and reduce water quality. Aquatic invasive species are often introduced into new bodies of water via boat hulls, trailers, and motor vehicle tires. Sonar can kill a number of other aquatic plants besides the targeted milfoil. Sedimentation, which can result from substrate, eutrophication, unstable banks, and churning of boat motors, reduces the light levels that water-marigold needs to grow well, and can bury plants. Excessive nutrients in ponds and lakes can lead to losses of the plants as has been seen in some areas, and can also lead to large expansions of the aquatic macrophytes and increase in Eurasian water-milfoil, which can competitively exclude the water-marigold. In the face of grass carp, pollution, sedimentation, and eutrophication, the species has been eliminated in many areas, and in places that have been restored by reducing these threats, the plants have not returned.

Information Gaps

Gaps in our knowledge of this species and its habitat includes the method of establishment in ponds – in other words does it require a water level drop; information on dispersal agents, possibly ducks; and dedicated surveys for this species, because it may be overlooked and misidentified as other more common species. Seneca Lake adjacent to the shoreline at Caywood Point also needs to be surveyed to determine if the plant is there or if the habitat is as suitable as is believed.

Management Direction Pertinent to Water-marigold

Forest-wide goals, objectives, standards, and guidelines that conserve RFSS in general, as well as agency policy, apply to this species. There is no species-specific management direction in the revised Forest Plan for this species. For this effects analysis, it is assumed that the species is present within the most suitable habitat on the Forest, in Seneca Lake along the shoreline at Caywood Point. Caywood Point is designated as a Recreational and Education Special Area, with one set of standards and guidelines, in all alternatives. Consequently, management direction for other management areas is not applicable for this species. Revised standards and guidelines associated with soil, water, and riparian area protection and restoration also apply in the Caywood Point area. Protective strips of undisturbed soil are required for all soil disturbing activities adjacent to waterbodies and wetlands in order to meet clean water standards. Construction of a dock or similar structure for boats at Caywood Point would not be prohibited by forest-wide or area-specific standards and guidelines. Agency policy directs that such actions would need to avoid or minimize impacts to the water-marigold, so as to not lead to a loss of viability on the Forest.

Potential Management Effects

Direct and Indirect Effects

Potential management effects do not vary by alternative for water-marigold, as all alternatives have the same applicable management direction. The Caywood Point Recreation and Education Special Area would not be within lands considered suitable for timber harvesting, motorized trail uses, surface development of minerals, or development of wind power or communication sites. Management activities would be limited to those that contribute to or otherwise protect the recreational, educational, historical, and cultural values of the area. Activities that could affect water-marigold directly or indirectly would occur on the shoreline of Seneca Lake, and could include trail development, vegetation management for access or vistas, dock or boat landing development, recreational use, and access to the shoreline by motor vehicles and boats.

The quantity of suitable habitat for the species on the FLNF is expected to remain stable. There are no plans for major changes to the aquatic habitat at Caywood Point. Water quality in this area is expected to remain stable or decline slightly. Reductions may occur through recreational use and disturbance along the shoreline, which can increase sedimentation, nutrient loads, and pollution. Removing vegetation along the shoreline can also reduce water quality by reducing shade, which leads to higher temperatures, and by improving access for recreational use. Motorized access by vehicles and boats can introduce and facilitate the spread of NNIS that are the primary

threat to this species, and boat motors can churn up aquatic vegetation in shallow areas and caused sedimentation. Management actions that create trails, landings, docks, points of access, or changes in vegetation are required by agency policy to avoid or minimize impacts to RFSS populations.

The population, if any, in Seneca Lake at Caywood Point is likely to remain stable over time. Given that this is the only likely habitat for the plant and it is assumed to be there, activities that would lead to loss of any population there would amount to loss of viability on the Forest, which is prohibited by agency policy. Determining the effects of activities on the plants at a site-specific level will require inventory of the site, as it has been identified as likely habitat. Water-marigold is distinctive when flowering, although it looks similar to other milfoils when not flowering. Even if not flowering, if the habitat is suitable and vegetation of plants that may be water-marigold is present, our assumption will be that the plant is there. Consequently, while these actions may impact individuals, their effects are expected to be minor.

Cumulative Effects

The FLNF offers a miniscule amount of habitat for this species when looked at in the context of its distribution in the region and across New York. Historical records likely include Seneca and Cayuga Lakes, as well as other lakes in the Finger Lakes region. There are no current records from Seneca Lake, but there are some records from nearby Keuka and Lamoka Lakes. Most of the documented current records are along the eastern edge of New York, but the species is not tracked by the state and so habitat is not targeted for searches. Consequently, the botanists knowledgeable of the species consider any Finger Lakes record important to the species' statewide distribution.

Actions that have occurred in the past, such as significant amounts of agriculture and forest conversion in the region, and the creation of mill ponds, have contributed to shifts in habitat suitability for water-marigold. With the loss of mill ponds and the continued declines in water quality and invasions by exotic organisms in the region and throughout the Northeast, this species may find less and less suitable habitat across these areas.

Protection of water-marigold is difficult because control of aquatic habitat is determined by multiple ownerships of shoreline, and watercraft regulations set by local municipalities. Future actions associated with other ownerships along these lakes, and Seneca Lake in particular, are more likely to influence the viability of water-marigold than activities undertaken by the FLNF. Because the FLNF shoreline on Seneca Lake is so small, any actions the Forest takes to improve conditions for the species will undoubtedly be outweighed by the overall lake conditions controlled by other ownerships.

Determination and Rationale

Implementation of the revised Forest Plan and its alternatives may impact individuals of water-marigold, but are ***not likely to result in a trend toward federal listing or a loss of viability on the FLNF***. This determination is based on the fact that most of the viability issues with this species on the Forest are associated with the limited availability of its aquatic habitat here. The availability of this habitat is generally outside of the control of Forest management direction or actions, although more shoreline can be purchased. Given the limits placed on management actions in these aquatic habitats by water and riparian protection standards, NNIS standards and guidelines, and agency policy on protecting RFSS, loss of viability or trends toward federal listing are unlikely to be a result of FLNF management actions. They are more likely to be the result of both the limited suitable habitat on the Forest and the activities of other ownerships along Seneca Lake and other lakes in the region.

Broad Beech Fern

Information presented here on this species is derived from reviews of the literature and discussions with botanists. These reviews are documented in the Forest Plan revision project file and are referenced in the Bibliography (USFS 2003h, USFS 2003i, SVE Monocot Panel 2003).

Distribution, Status, and Trend

Broad beech fern occurs from Maine and Quebec west to Ontario, southeast Minnesota, Iowa, southeast Kansas and eastern Oklahoma south to Florida, Louisiana and eastern Texas. In NY the species occurs in most counties in the state but does not occur in the Adirondack uplands and probably not in the higher elevations of the Catskills as well. There is one population of 66 plants known from the FLNF in Hector, Schuyler County, in Compartment

4. This population was first observed in 2000. There are at least ten other historical, extant, and unverified occurrences in the Finger Lakes region. The Finger Lakes region and the FLNF are not of particular importance or concern relative to the rest of the species range.

Broad beech fern is ranked G5 in North America and N5 in the United States (NatureServe 2004a), and is considered secure and stable across much of its range. It is ranked by the NYNHP as S4S5, and is considered secure enough in the state that it is not tracked (Young and Weldy 2004). The state lists this species, as it does all ferns, as exploitatively vulnerable, and so it is protected from collection. The species occurs in almost every county in New York although it is not a common species in the state. In the Cayuga Lake basin, which includes a small part of the FLNF the species is considered scarce. There have been some losses of habitat due to conversion of mesic woods to agriculture or development, but the overall range of the species has not contracted. Because these conversions occurred in the past and no major changes are expected in the near future, the status of the broad beech fern is expected to remain stable over the next 20 years. On the FLNF, however, the species is limited to a single population in a setting of recovering woodland, mixed with woodland converted to agriculture. This raises concerns about limited habitat suitability, as well as genetics and reproductive potential.

Life History and Habitat Relationships

Broad beech fern is a perennial fern of terrestrial habitats that reproduces via spores, which are produced between June and September. The species also reproduces vegetatively by means of long creeping rhizomes. It is not known how far spores disperse, but sexual reproduction and germination require adequate water. In central NY, the species prefers closed canopy, forested habitats with moist soil, although it is also found in sites that become drier later in the growing season. It is associated with most of the typical forest communities found on the Forest, although in this part of the species' range it grows in slightly acidic to slightly calcareous soils with perhaps a preference for higher pH sites. In the FLNF the one population occurs below 1,500 feet in elevation adjacent to a small forest stream. The species may prefer stable mature forested environments.

Limiting Factors and Threats

There are certain limiting factors for this species that are generally not associated with management of the FLNF. These include the limited population size and habitat availability for the species on the FLNF. There have not been dedicated surveys for this species, but several surveys of potential habitat with higher pH conditions have not turned up suitable habitat, increasing the odds that the single population on the Forest may be the only one there. A single population is always a viability concern due to concerns with the increased risk of loss from the Forest from one disturbance event at the population, and concerns with the reproductive and genetic potential of one population not very near any others with which it can crossbreed. Improved habitat suitability may develop over a long period of time as the Forest recovers. Much of the northern portion of the Forest has soil conditions that would appear to favor the less acidic pHs that are associated with this species. While inspections of some of these possible habitats have not been successful so far in identifying populations or suitable conditions, forest recovery from its agricultural history may take quite some time.

Since the species prefers stable mature forests, the main threats to existing and potential future populations are habitat conversion or alteration. On the Forest, most conversions have already occurred, and some of these converted areas are returning to forested conditions. Harvesting of trees that creates moderate to large canopy openings or alters microclimate can pose a threat to populations of broad beech fern. However, it is associated with habitats that do experience regular small-scale disturbances. The amount of canopy removal that is too much for this species is unknown, but partial removal is less likely to impact this species than complete removal. As it does not appear to depend on canopy openings, it will likely do well in areas that are managed for natural disturbances.

Information Gaps

The primary information gap for this species is its distribution on the Forest. Soil conditions suggest there should be much more suitable habitat than is either found in the field or found with the species. It is unknown if there is a recovery time needed for forests to offer suitable microhabitat conditions, or if certain types of disturbance histories, such as grazing or cultivation, affect the recovery of suitable habitat conditions for this plant. It may also be the case that the general ecological mapping done for the Forest is not adequate to characterize the conditions needed by broad beech fern to exist or persist.

Management Direction Pertinent to Broad Beech Fern

Forest-wide goals, objectives, standards, and guidelines that conserve RFSS in general, as well as agency policy, apply to this species. There is no species-specific management direction in the revised Forest Plan for this species. There is currently only one site for the species on the Forest, and so management associated with this site across the alternatives is either management for oak-hickory or management for northern hardwoods. Consequently the management direction associated with these management areas also applies. Management for oak-hickory focuses on even-aged silvicultural systems that create large canopy gaps to regenerate species that are intolerant of shade. Management for northern hardwoods focuses on uneven-aged silvicultural systems that create small gaps in the canopy to regenerate species that are tolerant of shade. Since the single population on the Forest occurs in a riparian zone, revised standards and guidelines associated with soil, water, and riparian area protection and restoration would also apply. Protective strips of undisturbed soil are required for all soil disturbing activities adjacent to waterbodies and wetlands.

Potential Management Effects

Direct and Indirect Effects

In all of the alternatives, the population of broad beech fern occurs in management areas that allow timber harvesting and winter motorized trail use. Timber harvesting can have a direct impact on habitat for this species by creating canopy openings, building logging roads, skidding logs, and compacting the soils. In Alternative 1, openings would likely be larger than in Alternatives 2 and 3, since management of the area with this population is for shade intolerant species in Alternative 1, while it is for shade-tolerant species in Alternatives 2 and 3. Trail construction can cause soil compaction, and both trail and logging road construction can increase the possibility of introducing seeds of NNIS into habitat for this species. One NNIS on the FLNF, garlic mustard, can compete effectively with native species in these moist shaded environments and ultimately exclude native plants and alter ecosystem structure and function. In all of the alternatives, agency policy would require avoidance of rare plant populations or a plan to minimize impacts during implementation of such activities.

The quantity of habitat for this species is likely to remain stable across the alternatives. This is because there is not a clear understanding of the fern's relationship with habitats on the Forest other than a general relationship to mesic, forested habitats with neutral pH, which may occur as small patches most anywhere on the Forest, especially in the northern two-thirds of the area. Given this distribution of its general habitat, these conditions are represented on the Forest in various management categories across the alternatives, with Alternative 2 protecting the most variety of conditions in forests managed for natural disturbance, and Alternative 1 protecting the least, with Alternative 3 in the middle. In any case, potential habitat is inventoried for rare species during the planning stage for projects, and if habitat or populations were found, mitigation measures would be applied.

Habitat quality for broad beech fern is expected to remain stable or improve slightly over the planning period. This is mainly a result of recovery of the Forest from previous agricultural land uses, and maintenance of the entire current forested landscape on the FLNF in a forested condition, albeit some of which is managed for timber production. As soil organic matter continues to build up and improve in productivity, as management techniques used on the Forest continue to remain sensitive to soil productivity, ecosystem recovery, and rare species protection, and as the forest in general ages and matures, conditions may improve enough to increase the likelihood that the species may be found in or spread to other areas on the Forest. How long this may take is unknown. Because Alternative 2 and 3 generally protect at least 5% of each ecological type on the FLNF in a management area where timber harvesting is not allowed, these alternatives are more likely to support improved conditions over the long-term for this species.

The population of broad beech fern is predicted to also remain stable during the planning period. Protections afforded by RFSS status ensure that management activities protect existing populations and ensure the species is not lost from the Forest. Loss of viability on the Forest may occur in spite of protections, due to a catastrophic event that could affect the population, or due to reproductive isolation. However, these events have a low probability of affecting this one population over the planning period. Actions on the Forest are designed to maintain or improve the species' viability, but viability may not improve until habitat conditions develop further or unless new populations are located.

Since the stand in which the population falls is only 67 years old, under an even-aged silvicultural system (Alternative 1) it will not have a regeneration harvest for at least another 33 years, which means there is additional time for habitat conditions to improve naturally before they may be disrupted by harvesting. In an uneven-aged

silvicultural system (Alternatives 2 and 3), trees are harvested every 15 years or so in any given stand, although harvests tend to create small gaps from the removal of single trees to small groups of trees. Individuals may be impacted during these activities, as long as the population overall is protected. Individuals can be run over by skidders and trees being dragged during summer logging, and this can also happen during winter logging if the ground is not sufficiently frozen. Canopy openings over part of the population can cause the plants to lose moisture, as these plants tend to have very shallow roots. However, given that the existing population is the only one on the Forest, small losses here may have large effects on its viability on the Forest, and so it is likely that management in this area will be conservative, regardless of which management area it falls within.

Cumulative Effects

The FLNF and the Finger Lakes region are not considered important to the distribution of broad beech fern. Information gathered on this species suggests that while the species has lost some populations and some habitat, it still maintains its range, and is expected to continue to do so over the next 20 years. Consequently, management actions taken on the Forest to maintain and protect this species and its habitat will contribute to its viability, but in a small way. However, the species is somewhat uncommon in its distribution across the State, and so over the long-term, sustainable management of mesic forests across the State and on the Forest can contribute to the species' long-term viability. If forest fragmentation and development continue at their current pace, within several decades the species may become more restricted in its distribution. At that point, conservation and sustainable management of these types of habitats may make the FLNF a more important area for this species. If there remains only one population on the Forest over this time, there is also the possibility that the population on the FLNF will decline and be lost as its reproductive potential declines. Even so, the species is not likely to decline across its range to the extent that it will lose viability in New York, given the security of the bulk of the populations in the state.

Determination and Rationale

Implementation of the revised Forest Plan and its alternatives may impact individuals of broad beech fern, but are ***not likely to result in a trend toward federal listing or a loss of viability on the FLNF***. This determination is based on the fact that most of the viability issues with this species on the Forest are associated with the apparent limitations of the available mesic woods habitat in providing what it needs. The availability of this habitat is generally outside of the control of Forest management direction or actions, although its quality can be affected by management actions. Given the limits placed on management actions in these mesic forest habitats by water and riparian protection standards, NNIS standards and guidelines, and agency policy on protecting RFSS, any loss of viability is unlikely to be a result of management actions but rather of the limited suitability of the habitat or the limited reproductive potential of the population. The species appears to be secure globally and nationally, not ranked in many states, and the FLNF population is of limited importance to the species distribution across its range. Most actions that the FLNF could undertake at its known population site or in its habitat would be highly unlikely to lead toward federal listing over the planning period.

Black-fruit Mountain-ricegrass

Information presented here on this species is derived from reviews of the literature and discussions with botanists. These reviews are documented in the Forest Plan revision project file and are referenced in the Bibliography (USFS 2004b, USFS 2004c, SVE Monocot Panel 2003).

Distribution, Status, and Trend

Black-fruit mountain-ricegrass occurs from Maine and Quebec west to Minnesota, North Dakota, South Dakota, and Nebraska south to Virginia, Kentucky, and Missouri. In New York, the species occurs in most areas except for Long Island and the Adirondacks. On the FLNF, it is known from only one population, which was first observed in 1991 in Hector, Schuyler County, Compartment 52. Additional populations are possible but not necessarily expected. The FLNF and the Finger Lakes region are not of particular importance or concern relative to the rest of the species' range.

Black-fruit mountain-ricegrass is ranked G5 globally and NNR across the United States (NatureServe 2004a). The species is generally considered secure across its range and in New York, and it is not tracked by the NYNHP (Young and Weldy 2004). In the Finger Lakes region the trend is unknown although in the Cayuga Lake basin the

species is considered scarce. There is only one population known on the FLNF, but the trend in its status on the forest is also unknown as it has not been revisited since 1991.

Life History and Habitat Relationships

This species is a loosely tufted, perennial grass with knotty rhizomes. In central New York it is in flower from July 15 to August 10. The fruit has an appendage attached to it, which is barbed. This indicates that the fruits can be dispersed via passing animals. Little else is known about other reproductive characteristics, dispersal, germination, or growth for this species. It seems to prefer dry to mesic, rocky forests, usually with an open understory, and it can tolerate some disturbance. It prefers circumneutral soils but can occur in soils slightly acidic to alkaline. On the FLNF, it was noted from an Appalachian oak-hickory forest in an area that is mapped ecologically as having acidic soils and till. It may also occur in acidic, calcareous, or shale talus slope woodlands; limestone woodlands; shale cliff and talus communities; and beech-maple mesic, maple-basswood rich mesic, or rich mesophytic forests. Since the species occurs in various talus slope and rocky environments, downslope movement and disturbance of soils may play an important role in species viability.

Limiting Factors and Threats

Given the current secure viability of the species in the region, State, and country, as well as discussions with botanists knowledgeable of the species, there are currently no known threats or other limiting factors facing the species. On the FLNF, the predominant limiting factor is the small population numbers, which can limit reproductive potential, thereby limiting the species. There appears to be a wider supply of potential habitat on the Forest than is indicated by the population, suggesting that the species may be overlooked. However, a full understanding of the species' habitat needs does not exist, and so habitat abundance and distribution may be more limiting than available information may suggest. Mapping of ecological types suggest that circumneutral soils are available across the northern two-thirds of the Forest, but that most of the soils are fine-textured and so coarse-textured rocky soils may be limited. In addition, as with broad beech fern, ecological mapping on the Forest may not be adequate to characterize the conditions needed by the species to exist or persist. The fact that it tolerates disturbance suggests that changes in habitat quality are less limiting than having enough rocky forest on circumneutral soil habitat available in a generally forested condition, although thresholds that provide conditions supporting stable populations are unknown. Disturbance that opens up of forested stands to invasion by NNIS could be detrimental, as this species is associated with an open understory.

Information Gaps

Information regarding the extent of the species' distribution on the Forest, more specific habitat relationships and limitations, and the species' relationship with fire and other disturbances, would be helpful.

Management Direction Pertinent to Black-fruit Mountain-ricegrass

Forest-wide goals, objectives, standards, and guidelines that conserve RFSS in general, as well as agency policy, apply to this species. There is no species-specific management direction in the revised Forest Plan for this species. There is currently only one site for the species on the Forest, and so management associated with this site across the alternatives is either management for oak-hickory or management for northern hardwoods. Consequently the management direction associated with these management areas also applies. Management for oak-hickory focuses on even-aged silvicultural systems that create large canopy gaps to regenerate species that are intolerant of shade. Management for northern hardwoods focuses on uneven-aged silvicultural systems that create small gaps in the canopy to regenerate species that are tolerant of shade.

Potential Management Effects

Direct and Indirect Effects

In all of the alternatives, the population of black-seed mountain-ricegrass occurs in management areas that allow timber harvesting and winter motorized trail use. Timber harvesting can have a direct impact on habitat for this species by building logging roads, skidding logs, and compacting the soils. In Alternatives 1 and 3, openings would likely be larger than in Alternative 2, since management of the area with this population is for shade intolerant species in Alternatives 1 and 3, while it is for shade-tolerant species in Alternative 2. Opening the forest canopy with shelterwoods, small clearcuts, and thinnings would allow increased sunlight on the forest floor. While it appears that this species may benefit from some of these disturbances, it is not certain if at some point these disturbances may be detrimental. Both trail and logging road construction can increase the possibility of introducing seeds of NNIS into habitat for this species. Many NNIS can compete effectively with native species in dry disturbed habitats, and could impact this species by shading it out of the understory. In all of the alternatives,

agency policy would require avoidance of rare plant populations or a plan to minimize impacts during implementation of such activities.

Due to the uncertainties regarding the effects of management activities on the species, and its apparent tolerance or preference for some level of disturbance, it is likely that both habitat quantity and quality for this species will remain stable during implementation of the revised Forest Plan. If the species is strongly associated with coarse soils, its habitat on the Forest will be restricted to the southern third of the Forest, which is also limited in the amount of circumneutral soils available. This level of restriction will continue to exist regardless of the management strategy adopted by the Forest.

A variety of management strategies are employed in each of the alternatives, and all the alternatives place some proportion of the various ecological conditions on the Forest in some protected management category. Consequently, the general habitat needs of the species will likely be found across the Forest in various locations under all of the alternatives. Alternatives 2 and 3 place more of the Forest in protected management areas where disturbances are caused primarily by natural processes than in Alternative 1. It is unclear at this point if over the long-term this will make the habitat less suitable. Natural disturbances will still occur, but will generally be smaller than those created by human intervention.

The population of black-fruit mountain-rice-grass is predicted to also remain stable during the planning period. Protections afforded by RFSS status ensure that management activities protect existing populations and ensure the species is not lost from the Forest. Loss of viability on the Forest may occur in spite of protections, due to a catastrophic event that could affect the population, or due to reproductive isolation. However, these events have a low probability of affecting this one population over the planning period. Actions on the Forest are designed to maintain or improve the species' viability, but viability may not improve unless new populations are located.

During management activities, individual plants in the population may be impacted, as long as the population overall is protected. Individuals can be run over by skidders and trees being dragged during summer logging, and this can also happen during winter logging if the ground is not sufficiently frozen. However, given that the existing population is the only one on the Forest, small losses here may have large effects on its viability on the Forest, and so it is more likely that management in this area will be conservative, regardless of which management area it falls within.

Cumulative Effects

The FLNF and the Finger Lakes region are not considered to be of particular importance to the distribution of black-fruit mountain-ricegrass. Discussions with botanists reviewing this species suggest that its habitat is distributed broadly across its historical range and is of sufficient quality to support the interactions needed by the species to sustain itself; this is likely to be the case over the next 20 years. Consequently, management actions taken on the Forest to maintain and protect this species and its habitat will contribute to its viability, but in a small way; management actions that may damage individuals are not likely to have any affect on the species overall viability. However, if forest fragmentation and development continue at their current pace, within several decades the species may become more restricted in its distribution. At that point, conservation and sustainable management of these types of habitats may make the FLNF a more important area for this species. If there remains only one population on the Forest over this time, there is also the possibility that the population on the FLNF will decline and be lost as its reproductive potential declines. Even so, the species is not likely to decline across its range to the extent that it will lose viability in New York, given the security of the bulk of the populations in the state.

Determination and Rationale

Implementation of the revised Forest Plan and its alternatives may impact individuals of black-fruit mountain-ricegrass, but are ***not likely to result in a trend toward federal listing or a loss of viability on the FLNF***. This determination is based on the fact that most of the viability issues with this species on the Forest are associated with the apparent limitations of the available rocky dry-mesic woods in providing what it needs. The availability of this habitat is generally outside of the control of Forest management direction or actions; its quality can be affected by management actions. Given the limits placed on management actions by agency policy on protecting RFSS, any loss of viability is unlikely to be a result of management actions but rather of the limited suitability of the habitat or the limited reproductive potential of the population. The species appears to be secure globally and nationally, not ranked in many states, and the FLNF population is of limited importance to the species distribution

across its range. Most actions that the FLNF could undertake at its known population site or in its habitat would be highly unlikely to lead toward federal listing over the planning period.

Culver's-root

Information presented here on this species is derived from reviews of the literature and discussions with botanists. These reviews are documented in the Forest Plan revision project file and are referenced in the Bibliography (USFS 2004d, USFS 2004e, SVE Dicot Panel 2003).

Distribution, Status, and Trend

Culver's-root grows from Vermont to Ontario and Manitoba, south to Georgia and Louisiana. It has been reported from many counties in New York, but primarily those in the Finger Lakes region and the Hudson Valley. It has not been reported from the northern part of the state. It has occurred in the Finger Lakes region, and apparently was once on the FLNF, in old fields in the vicinity of Picnic Area Road. It is likely to still occur somewhere on the FLNF, and is frequently overlooked because it grows with tall grasses and herbs. The FLNF is not considered significant to the species' range.

This species is ranked G4 globally and N4? in the United States (NatureServe 2004a). The State of New York considers the species rare, ranks it as S2, and tracks its populations across the State (Young and Weldy 2004). The species is considered rare in the Cayuga Lake basin, which includes the eastern portion of the Forest. It is abundant in parts of its range, but declining at the edges of its range and in some of its core habitat. In New York, there are many more historical occurrences than current ones. It is rare within the Finger Lakes region and there are presently no confirmed extant occurrences in the Finger Lakes region or on the FLNF. However, it has been known from both places and may be extant.

Life History and Habitat Relationships

Culver's root is an herbaceous perennial that spreads by rhizomes and forms mats. It blooms in July and August and is pollinated by bees. The plants produce many flowers and fruits, and each fruit contains many small seeds. The seeds do not appear to have any structures to facilitate dispersal by wind, animals, or water. The seeds are tiny, need to be cold stratified to germinate, and when planted should be scattered across the surface of the soil to facilitate germination, suggesting poor germination if buried. It appears to have very low germination rates in the field. The species appears to prefer nutrient-rich moist soil in full sun to light shade in which to germinate, but will tolerate drier conditions once established. The species will self-sow easily in a garden setting.

This species uses a wide variety of habitats, including open woods, thickets, fields, prairies, stream banks, roadsides, and other edge habitats. However, it is best known as a prairie plant. It can occur on moist or dry soil, and can withstand inundation. It grows in open oak-hickory forest and in fens. It may be restricted to areas with calcareous soil. It needs open conditions, though it can grow in dense patches with other grasses and herbs. It benefits from fire, which may keep its habitat open, but it does not require fire to remain viable. In central New York, it seems to always occur in single isolated patches. A combination of low germination rates, high moisture and sunny conditions needed for germination, and high levels of nutrients needed to germinate and survive, suggest that in spite of the abundance of open land on the Forest, suitable conditions for this species may be quite limited. The only natural open woods habitat on the Forest is known from the southeastern corner of the Forest, and these woods are dry, rocky, and acidic. Since most lands in the Finger Lakes region were predominantly forested during the late 18th century (Marks and Gardescu 1992), it is likely that this plant either migrated into the region during settlement and clearing, or may have been resident in open lands maintained by Native Americans along the eastern shore of Seneca Lake and in association with settlements to the north. Burning, thinning and light harvesting in forests can create open woods conditions, but without long-term maintenance in open conditions they are unlikely to provide suitable habitat for more than 5-10 years at which point the canopy will close.

Limiting Factors and Threats

One of the primary limiting factors for Culver's-root on the FLNF is the apparent habitat limitations the Forest provides. In spite of abundant open lands on the Forest, much of this habitat is probably unsuitable for establishment of the species due to the apparently limited distribution of the conditions needed for the species to germinate and develop. While ecological mapping indicates an abundance of non-acid soils, particularly to the

north where more lands are open, field inventories of forested stands on non-acid soils have suggested that the vegetation does not usually reflect these soil conditions. It may be that historical land uses, particularly agriculture, have led to a decline in soil productivity and nutrient status in general. Recovery of soil productivity may take many decades, and until that time most of these open lands may not provide suitable conditions.

Culver's-root is generally a prairie species, and may have opportunistically taken advantage of the lands in the Finger Lakes region that became open during settlement. However, there may be different combinations of associated species or different soil characteristics in the Finger Lakes region or on the FLNF that make it less suitable overall, and as this habitat shrinks it may limit the viability of the species at the edges of its habitat preferences. In addition, given how the species tends to occur in single patches in any given area of habitat, it may require broad expanses of suitable habitat in order to interact with other populations and establish new populations. Since suitable microsites for germination may be limited and seeds do not appear to be wind or animal dispersed, this may help to explain the species' distribution pattern in New York of occurring in single isolated patches. Although management of the FLNF does not affect the natural distribution of these microsites and their frequency on the landscape (in terms of calcareous soils and adequate soil moisture), management can have an impact on the quality of the species' habitat.

Habitat loss and succession to closed canopy forest are considered the primary threats to this species in our area, although it is not considered significant in New York. Open habitats are often converted to developments or are in cultivation or grazed, otherwise they tend to be allowed to revert to forest. The FLNF is one of the few places in the region that maintains grassland and shrubland habitat without grazing, and such habitats with the right nutrients and moisture levels can offer opportunities for the species. However, maintaining meadows and shrublands in an open condition can also directly impact individuals – plants and populations can be lost when repeated mowing occurs before plants can flower and produce seed. Maintaining these habitats using prescribed fire is likely less of a threat since it occurs earlier in the season and so allows plants to flower and fruit. It may also help to burn any thatch that has developed and bring the seeds in contact with the soil. Culver's-root is also collected for medicinal purposes, although local botanists do not see this threat as an important issue in New York. Local botanists also do not consider competition with NNIS an issue in New York, although it is in other parts of the species' range.

Information Gaps

The primary information gap for this species is information on whether it still occurs on the Forest. Another area where information is needed is a deeper understanding of its habitat needs. It is associated with a wide range of fairly common habitats, and yet it is rare. Its relation to calcareous conditions needs further study.

Management Direction Pertinent to Culver's-root

Forest-wide goals, objectives, standards, and guidelines that conserve RFSS in general, as well as agency policy, apply to this species. There is no species-specific management direction in the revised Forest Plan for this species. There is currently only one site for the species on the Forest, and so management associated with this site across the alternatives is generally management for shrubland habitat. Consequently the management direction associated with this management area also applies. The emphasis of shrubland management is maintaining brushy conditions, including a mix of herbaceous plants with shrubs and small trees. Shrublands are maintained every 3-20 years in order to maintain crown closure by trees at less than 50% and at least 80% of the shrubland in the mixed vegetation structure. Additional habitat for this species may be available across the Forest in areas having non-acidic soils and till with adequate moisture that fall within the shrubland or grassland for wildlife management areas. Grasslands for wildlife are grasslands managed without grazing using mainly prescribed fire and mowing. Maintenance is generally restricted to early spring and late summer to fall to avoid impacts to birds that nest and raise young in the grasslands. Maintenance of these grasslands generally occurs on a 1-3 year cycle.

Potential Management Effects

Direct and Indirect Effects

Maintenance of shrublands as outlined in direction for this management area will likely provide some benefit to Culver's-root, as long as the underlying habitat conditions needed for germination and plant development are also present. The historical site for the species on the Forest is currently within a shrubland management area, described as an old field with goldenrods 20 years ago. Having a diversity of vegetation structure with limited canopy closure will help to conserve moisture as well as provide the light conditions with which the species is

associated. Maintenance by prescribed fire will have fewer effects than mowing, unless mowing can occur either before or after flowering and seed development. Hand cutting of shrubs and trees is unlikely to impact the species except through direct trampling or skidding of logs or brush. Management effects in grasslands for wildlife will be similar, although maintenance will be more frequent. However, the constraints on timing of maintenance needed for birds may also reduce the risks to Culver's-root from mowing before flowering or seed production. In all of the alternatives, agency policy would require avoidance of populations or a plan to minimize impacts during implementation of such activities. Consequently, these types of impacts are not likely to lead to loss of any populations at the known site or elsewhere.

Both habitat quality and quantity for Culver's-root will vary by alternative. Alternative 1 maintains the most habitat in grassland for wildlife and shrubland management areas, amounting to 2,543 acres. It also maintains the current configuration of the shrubland habitat in the vicinity of the known site for Culver's-root. However, most of the acreage in these management areas is in shrublands, and about one-third of these shrubland acres have already reverted to young forest, including large portions of the shrublands in the vicinity of the known site for this species. In order to create potentially suitable habitat a great deal of clearing would need to be done in these areas under this alternative; historically this work is a low priority in favor of maintaining shrublands that have not yet succeeded to young forest. At this point, the portion of the shrubland in the area of the known site for Culver's-root that has succeeded to forest is not suitable habitat, and there's no guarantee that reclaiming that shrubland will improve conditions for the species if it has been lost.

Alternative 3 provides 2,109 acres of grassland for wildlife and shrubland habitat. While the shrubland habitat is still about two-thirds of this acreage, most of these areas are still in shrubby condition and are more likely to be maintained that way. The shrubland areas that are still shrubby in the area of the known site for Culver's-root are maintained in this alternative as well as in Alternative 2. Alternative 2 provides the smallest acreage of this habitat, at 1,955 acres, with a slightly smaller proportion in shrubland than in Alternative 3, but again representing acres that are still shrubby and not in young forest. These acreages do not vary substantially between Alternatives 2 and 3, and so the differences in effects are minor. In addition, because only a small proportion of this habitat may turn out to be suitable due to microsite conditions that can't be predicted with current information, the acreages in the alternatives may be less important than the geographical location of these open habitats in relation to the required microsite conditions.

The population of Culver's-root known from the FLNF is currently considered historical on the Forest. The precise location is not known, although the general area of shrublands in which it could have occurred is known and amounts to a little over 200 acres. Since about half of these acres have succeeded to young forest, the likelihood that this population remains stable across all the alternatives is low. The areas have not been searched, however, and the population could be rediscovered. If that were the case, then the knowledge of its location would lead to management under all alternatives that would likely support a stable population. Finding this population after 20 years of limited maintenance in the area from which it was originally known would suggest that the population is associated with important microsite conditions that could be maintained by shrubland management. It would also help us to refine searches and identify more likely places for the species on the Forest. However, none of these activities will likely change the poor viability prospects of the species on the Forest, as long as only one population is known.

Cumulative Effects

The FLNF and the Finger Lakes region are not considered to be of particular importance to the distribution of Culver's-root. The FLNF supplies a limited amount of potential protected habitat in the Finger Lakes region, which itself is at the edge of the species' range. It is not currently known from open habitats at the Montezuma National Wildlife Refuge either, although there is an old record from the 1920s or earlier in Junius. However, most of the remaining habitat that may be suitable in the region is not protected for rare plants, and the overall ownership pattern in the Finger Lakes region is fragmented. Open habitats in the region tend to be in land uses that do not support the continued existence of the species, such as grazing, cultivation, and development. Consequently, any rediscoveries of this species in the region on protected land and on the Forest would help to contribute to overall viability of the species. If forest fragmentation and development continue at their current pace, within several decades the species may become even more restricted in its distribution. At that point, conservation and sustainable management of these types of habitats may make the FLNF and the region more important for this species. If there remains only one population on the Forest over this time, there is also the possibility that the population on the FLNF will decline and be lost as its reproductive potential declines, or if a

disturbance event destroys the population. This loss would be the result of actions beyond the control of managers on the FLNF, as it would likely be the result of limited habitat suitability on the Forest.

Determination and Rationale

Implementation of the revised Forest Plan and its alternatives may impact individuals of Culver's-root, but are ***not likely to result in a trend toward federal listing or a loss of viability on the FLNF***. This determination is based on the fact that most of the viability issues with this species are associated with the limited availability of suitable habitat on the Forest. The availability of this habitat is in part outside of the control of Forest management direction or actions, as it relates to inherent soil moisture, nutrient status, and levels of soil calcium. Between 12-16% of the lands within the Forest, depending on alternative, would be managed for open habitat conditions that could support this species. Given the limits placed on management actions by agency policy to protect RFSS, and the general availability of open lands on the Forest maintained for conditions that support this species, loss of viability is unlikely to be a result of management actions but rather of the limited suitability of the habitat. The species appears to be secure globally and nationally, and not ranked in many states, so any of the actions that the FLNF could undertake in these habitats would be highly unlikely to lead toward federal listing over the planning period.

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APPENDIX F TRANSPORTATION ANALYSIS

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Background

Roads Analysis

In August 1999, the Washington Office of the USDA Forest Service published Miscellaneous Report FS-643 titled “Roads Analysis: Informing Decisions about Managing the National Forest Transportation System” (USDA 1999). The objective of roads analysis is to provide decision makers with critical information to develop road systems that are safe and responsive to public needs and desires, affordable and efficiently managed, have minimal negative ecological effects on the land, and are in balance with available funding for needed management actions.

Roads analysis is not a decision process, nor does it constitute a federal action. It will serve to guide future project-scale analyses by identifying conditions, changes, and effects relevant to implementing forest plans. In January 2001, the Forest Service published the Transportation Final Rule and Administrative Policy, authorizing units to use, as appropriate, the road analysis procedure embodied in FS-643 (USDA 2001) to assist land managers in making major road management decisions.

Trails Analysis

The objective of Trails Analysis is to provide decision makers with critical information to develop and maintain trail systems that are safe and responsive to public needs and desires, affordable and efficiently managed, have minimal negative ecological effects on the land, and are in balance with available funding for needed management actions. The Trails Analysis was done to identify both values and risks for each trail segment. Issues considered included erosion, stream crossings, impacts to wildlife, safety, user conflicts, loop opportunities, solitude, pastures, parking, wetlands, Research Natural Areas, and special areas. This trails analysis is not a decision process, nor does it constitute a federal action. It will serve to guide future project-scale analyses by identifying conditions, changes, and effects relevant to implementing forest plans.

Process

Roads and trails analyses are each a six-step process. The steps are designed to be sequential with the understanding that the process may require feedback among steps, over time, as an analysis matures. The amount of time and effort spent on each step differs by project, based on specific situations and available information. The process provides a set of possible issues and analysis questions for which the answers can inform choices about road and trail system management. Decision makers and analysts determine the relevance of each question, incorporating public participation as deemed necessary. The six steps are:

- Step 1. Setting up the Analysis
- Step 2. Describing the Situation
- Step 3. Identifying Issues
- Step 4. Assessing Benefits, Problems and Risks
- Step 5. Describing Opportunities and Setting Priorities
- Step 6. Reporting

Additional information on the analysis process is available at:
http://www.fs.fed.us/r9/gmfl/nepa_planning/plan_revision/tap/tap.htm

Products

The products of the road and trail analyses are two reports for decision makers and the public that document the information and analyses used to identify opportunities and set priorities for future National Forest System road and trail systems. Included in these reports are maps displaying the known road and trail systems for the analysis areas, and the risks, needs, and opportunities for the Forest. The Roads Analysis Process Report is available online at:
http://www.fs.fed.us/r9/gmfl/nepa_planning/plan_revision/rap/pubdocs.html

The reports will each:

- Identify needed and unneeded roads and trails
- Identify road and trail-associated environmental and public safety risks
- Identify site-specific priorities and opportunities for road and trail improvements and decommissioning
- Identify areas of special sensitivity or any unique resource values

Key Analysis Results and Findings

Since these analyses were broad, Forest-scale analyses, the road and trail systems as a whole were reviewed. Site-specific improvements will be identified at a smaller scale. In general, the road system as well as the trail system on the Finger Lakes National Forest is currently meeting the strategic intent of the guidance in the 1987 Forest Plan (USDA 1987). There is always room for improvement, however. The main opportunities for road system improvements are related to budget, road management, the environment, recreational opportunities, and National Forest access. Improvements to Forest jurisdiction roads as well as providing financial assistance to local and other state and county agencies could be implemented with increased budgets. Improving road conditions would in turn improve resource concerns, such as reducing sediment delivery into waterways. Some trails, however, were identified for improvement. The main opportunities for trail system improvements are related to: budget, trail management, the environment, recreation opportunities, and Forest access.

Specific results and findings are:

- Green Mountain and Finger Lakes National Forests receive approximately $240,000 from the Eastern Region of the USDA Forest Service that is available for road maintenance, construction, and reconstruction. An estimate of the most efficient budget level is $400,000. The Green Mountain and Finger Lakes National Forest cannot meet maintenance requirements of the existing road system with current budgets.
- The Green Mountain and Finger Lakes National Forests receive approximately $300,000 from the Eastern Region of the USDA Forest Service that is available for trail maintenance, construction, and reconstruction. An estimate of the most efficient trails budget level is $325,000. The Green Mountain and Finger Lakes National Forest cannot meet maintenance requirements of the existing trail system with current budgets.
- 4.2% of the roads on the Finger Lakes National Forest are Forest Service system roads; 95.8% are State, local, or private jurisdiction. The Green Mountain and Finger Lakes National Forest should continue to work forming cooperative agreements with local governments provided the additional needed funds are made available.
- Some roads are not listed under the appropriate jurisdictions. A preliminary review of the database shows roads listed under questionable jurisdiction. This was based on data, however, that had not been updated as the Forest acquired legal jurisdiction on roads. During research for this analysis, Forest Service lands staff reviewed and updated some of the jurisdiction information in the database. Efforts to update and correct the data files will continue.
- The Finger Lakes National Forest is currently following the strategic intent of the Forest Plan. Management decisions at the project, watershed, and Forest scale meet guidance in the Forest Plan.
- There are potential environmental impacts from the road system and from the trails system that need to be prioritized and evaluated for future analyses at a sub-Forest level scale. This roads analysis process identified potential high risk areas for the environment; however, not all high-risk areas are identified at this Forest scale review.
- An extensive transportation network serves the Finger Lakes National Forest. The existing road system and trails system are meeting current access needs. The Forest could improve access points for dispersed access, provide additional trailhead parking, and improve access to water bodies for the elderly or disabled.

Recommendations and Opportunities

Specific opportunities identified from the roads analysis include:

- Conduct a Roads Management Objectives (RMO) analysis on the entire road network to determine needs and deficiencies. Prioritize the list of needs to optimize the use of limited funds. Once complete, the proper maintenance level for each road segment will be determined and assigned. Roads creating environmental risk which provide limited benefit should be considered for closure or decommission.
- Conduct a Roads Analysis Process (RAP) at the watershed or project scale to determine if roadway construction and maintenance efforts are consistent with the intent of the current Forest Plan.
- Inventory and evaluate road signs and install signage that meets Forest Service or highway standards.
- Assist towns in maintenance of road system. This could include installation of proper drainage structures including ditches, surface treatments, and snow removal through cooperative agreements.
- Seek and obtain National Forest System (NFS) funds to assist towns in road maintenance and reconstruction.

- Seek and obtain other funding sources such as Capital Improvement or Road and Trail Deposit Fund (10% funds).
- Relocate or reconstruct segments of Forest Service jurisdictional roads that do not have adequate buffer strips or that constantly wash out.
- Review existing special use permit roads to see that road construction and maintenance requirements protect soil and water.
- Conduct scoping studies at transportation facilities near recreational areas to determine if adequate parking and access exist and where additional facilities should be located if needed.

Specific opportunities identified from the trails analysis include:

- All existing trails should remain open.
- Three of the publicly proposed trails should move forward to a detailed analysis:
    1. Burnt Hill Alternative
    2. The Horse Camp Connector
    3. Pearsall Loop Trail
- The Forest Service needs strong partnerships to achieve collective goals with the public.
- Mountain bikes should be allowed with educational signing on all multiple-use trails after completing a more detailed analysis.
- ATVs should not be allowed on the Forest (no change from current policy)
- The risks highlighted in the analysis will drive the operations and maintenance for program objectives.

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APPENDIX G RESPONSES TO PUBLIC COMMENTS

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Introduction

On May 13, 2005, the Finger Lakes National Forest (FLNF) announced in the Federal Register that the Draft Environmental Impact Statement (Draft EIS) and Proposed Revised Forest Plan (Proposed Plan) were available for public review. Following this release, a formal three month comment period provided interested publics a chance to review and provide feedback on the draft documents.

The purpose of the Draft EIS and Proposed Plan comment period was to: 1) compile public concerns and comments regarding the draft documents; 2) gather issues the public felt had been left out or inadequately addressed in the draft documents and should be included in the Final EIS and Final Plan; and/or 3) confirm that the planning team had effectively addressed all the issues currently facing the FLNF. Although public comments were analyzed to determine issues of public concern, they were not tallied as votes for or against particular topics.

Public response provided more than 550 letters. Review of the public comments showed areas of disagreement on some parts of the draft documents; however, many people expressed general support for managing and protecting the FLNF to continue providing ecological, social, and economic values for present and future generations. The majority of the comments received dealt with public interest in changing the preferred alternative selection, natural resource and timber management, and land designations, such as locations of management areas and special designations.

To organize and analyze each public response received, a "content analysis" process was conducted. Content analysis included logging the public respondents and letter numbers into a database, filing two copies of every letter, reading the letters, and coding individual requested actions and noted concerns contained within the letters. The coded comments were then grouped into public concern (PC) statements and subconcern (SC) statements and responded to in this appendix.

The comments received provided valuable input towards development of the Final EIS and Final Revised Plan. It is important to recognize that the consideration of public comment was not a vote-counting process in which the outcome was determined by the majority opinion. Relative depth of feeling and interest among the public can serve to provide a general context for decision-making. It is the appropriateness, specificity, and factual accuracy of comment content that serves to provide the basis for modifications to planning documents and decisions. Further, because respondents are self-selected, they do not constitute a random or representative public sample. The National Environmental Policy Act (NEPA) encourages all interested parties to submit comment as often as they wish regardless of age, citizenship, or eligibility to vote. Respondents may therefore include businesses, people from other countries, children, and people who submit multiple responses. Therefore, caution should be used when interpreting comparative terms in the summary document. Every substantive comment and suggestion has value, whether expressed by one respondent or many. All input is read and evaluated and the analysis team attempted to capture all relevant public concerns in the analysis process.

Appendix G is organized by topic and summarizes the public comments submitted on the Draft EIS and Proposed Forest Plan. The summarized public comments are captured as "Public Concern" statements and are numbered as such. Subconcern statements are utilized to capture a myriad of distinct rationales, specific locations, or particular details that support the common PC conclusion. Subconcerns are therefore numbered according to the PC they support and distinguished by alphabetical coding. This appendix also includes the Forest Service's response to the public's concerns.

Decision-Making Processes and Methods (10000)

Decision-making philosophy (11000)

PC 11000-1: The Forest Service should continue to utilize natural ecological processes in concert with diverse management tools to support vegetation management activities.

Response: The Forest Service's intent is to continue to approach management of the FLNF in this way (see revised Forest Plan Goal 2 objectives, p. 10, and Goal 5 objectives, p. 13).

PC 11000-2: The Forest Service should manage forest resources in a more flexible way that provides more options for silvicultural prescriptions based on existing forest types and age-class composition, and not rely on high levels of manipulation to meet desired future conditions and timber management objectives.

Response: One commenter is concerned that revised Forest Plan direction does not provide adequate flexibility to manage composition and age class of vegetation with a variety of silvicultural tools. Other commenters were concerned that northern hardwood stands occur in the Oak Hickory Management Area (MA), and oak-hickory stands occur in the Northern

Hardwood MA, so there is not consistent alignment between current forest type and expected forest type based on the MA allocation. Some commenters are concerned about how stands of types different than those indicated by the MA name would be managed, while others are simply concerned about this apparent misalignment. One commenter noted that maps of New York provided by the Gap Analysis Program (GAP) indicate that most of the Oak Hickory MA is northern hardwoods.

The Forest Service believes that the revised Forest Plan provides flexibility in the application of silvicultural methods in the Oak Hickory and Northern Hardwood MAs. The revised Forest Plan does not mandate or require a particular silvicultural tool to be used in a particular place; the MAs provide guidance, but do not dictate. Because the revised Forest Plan is a strategic document and MA allocations were meant to be broad and general, it is inevitable that the Northern Hardwood and Oak Hickory MAs will each include forests of various types (see FEIS Wildlife section 3.6, Vegetation Conditions and Wildlife Habitat). Consequently, site-specific field examinations and environmental analysis will ultimately determine the most appropriate treatment to manage these stands to best fulfill these objectives over time (revised Forest Plan p. 10). Public concerns will be taken into account as projects are developed, as required by the National Environmental Policy Act (NEPA).

The revised Forest Plan includes a composition objective under Goal 2 that native forest types will be maintained on sites that ecologically support these forest types (revised Forest Plan p. 10). All applicable resources, such as current composition, field verification, data, and research like the Ecological Landtype (ELT) report (DeGloria 1998) and the 1790s military tract data (Marks and Gardescu 1992) can be used to evaluate potential natural vegetation, as well as desired future conditions for both vegetation and wildlife habitat. Both current composition based on field inventory data and ELT mapping were used in the allocation of lands to these two management areas, and implementation of the revised Forest Plan will help to determine the success of these allocations, and what adaptations are needed to account for new information (DEIS p. 3-45). The GAP map products noted by one commenter are based on analysis of general existing forest conditions, and do not incorporate ecological tendencies based on ELT analysis or pre-European settlement tree surveys. The ELTs and the military tract data provide greater insight into the ecological processes and systems on the FLNF than the GAP data, and so help to define the range of natural variability under which the forests of this region developed (DEIS pp. 3-41 to 3-43). Over the long-term, management of the ecosystems of the FLNF within or in recognition of the range of natural variability will help them to resist losses of biodiversity (see also DEIS section 3.1.4, pp. 3-9 to 3-13).

Language has been added to the revised Forest Plan to clarify the inherent flexibility of managing the Forest resources. The desired future conditions and vegetation management guidelines for both the Northern Hardwood and the Oak Hickory Management Areas have been clarified to indicate that stands of other types will be found there, and a variety of silvicultural tools can be used to manage for them (see revised Forest Plan pp. 48 and 49). The rotation age objectives have also been clarified to indicate that extended rotations may be used where other objectives in addition to timber are desirable (revised Forest Plan p. 11).

Public Involvement (12000)

PC 12000-1: The Forest Service should coordinate with volunteer partners, such as the North Country Trail Association, prior to and during timber harvests that will affect the NCT corridor.

Response: Harvest activities near the North Country Trail are coordinated with the National Park Service in accordance with the Memorandum of Understanding (MOU) (revised Forest Plan p. 54). The Forest Service recognizes that the timber management program should be well integrated with the heavy recreation use that takes place across the FLNF. Forest-wide and management area standards and guidelines are designed to ensure that harvesting is done with a minimal impact to recreation opportunities are provided in the Forest Plan (see revised Forest Plan Chapters 2 and 3 and DEIS p. 3-187). Site-specific environmental analysis with opportunities for public involvement will be initiated prior to any timber harvest activities. Any issues regarding recreation would be addressed through this process.

Alternatives/Options (20000)

Document general (Forest Plan, FEIS, DEIS) (21000)

PC 21000-1: The Forest Service should include a more detailed discussion on the location of wetlands in the Final EIS.

Response: The wetlands maps that are used by the FLNF come from the US Fish and Wildlife Service's National Wetlands Inventory (NWI). Wetlands maps for central New York are available at the NWI website (http://www.fws.gov/nwi/). Included on the revised Forest Plan/FEIS CD that is available for public review is a published map that the commenter can navigate to investigate management area allocations in relation to information on the NWI website regarding wetland distribution. Within the hardcopy version of the FEIS, the scale of the map product would likely be too small to clearly identify wetlands. In addition, some wetlands are located on the NWI maps, but many are not located on any maps. When inventories are done or site-specific projects are proposed, the areas of interest are reviewed for known or possible wetland conditions. When wetlands are located, they are identified on maps and the coordinates of their locations recorded with Global Positioning System (GPS) technology. These areas are then added to the Forest Service database. As maps are regularly updated on the NWI website to reflect new wetlands, it makes sense to maintain these maps electronically with the most recent information.

PC 21000-2: The Forest Service should include an additional indicator in the effects analysis labeled "Acres Suitable as Habitat for Native Wild Game Species" to assess the Preferred Alternative's impacts on game species and recreational hunting.

Response: The Forest Service believes that an additional indicator to evaluate game species would be redundant with the four existing indicators: grassland habitat; shrubland habitat; contiguous, mature forest habitat; and habitat for management indicator species (MIS). Each of the existing indicators addresses

various aspects of habitat for a variety of wildlife species, including game species. Two of the six MIS for the FLNF are game species (gray squirrel and ruffed grouse). Other MIS include a shrubland species (common yellowthroat), a species for regenerating (0-9 year old) deciduous stands (chestnut-sided warbler), and an assemblage of species (bobolink, eastern meadowlark, and savannah sparrow) as MIS for grassland. Shrubland, regenerating deciduous forest, and grassland are habitat types that are important to many game species and other species of wildlife. See Wildlife section 3.6 in the FEIS for a discussion of the MIS selection process. [Note: The selection of an assemblage of bird species as an MIS for grassland in the revised Forest Plan represents a departure from the proposed revised Forest Plan. See responses to PC 32200-4 and PC 32200-5.]

The entire acreage of the FLNF provides a mix of diverse habitats. Not all habitats are suitable for all species. Not all habitats are suitable or optimal for all game species. The revised Forest Plan provides a mixture of management actions and land allocations designed to provide habitats to support viable populations of plants and animals, including game species, while providing adequate resources for a wide range of recreation uses, and other social, economic, and political needs (FEIS section 3.6.2).

Recreational hunting is a popular activity on the FLNF and the revised Forest Plan does not restrict opportunities for hunting. Placing restrictions on hunting is outside of the scope of the revised Forest Plan since the State of New York is responsible for establishing hunting regulations and bag limits. Using recreation hunting as an indicator in the recreation section of the FEIS would not be an effective measure among alternatives because opportunities are the same in all alternatives presented in the FEIS.

Plan components (22000)

PC 22000-1: The Forest Service should revise Forest-wide Age Class Objectives to include a higher desired percentage of old trees, reflective of pre-European settlement conditions.

Response: The commenter is concerned that the FLNF had a much higher proportion of older trees before European intervention, and that the age class objectives associated with Goal 2 should therefore reflect a higher proportion than indicated (see revised Forest Plan p. 11). The age class objectives in the revised Forest Plan, however, are applied only to lands where even-aged silvicultural practices are used. This is indicated both in the third objective under Goal 2 for Age Class Objectives for Northern Hardwood and Oak Hickory Management Areas (MA), as well as in the title of Table 2.2-2 (revised Forest Plan p. 11). In essence, these age class objectives would only apply to stands where the Forest Service manages for shade-intolerant hardwoods, predominantly in the Oak-Hickory MA. In these circumstances, stands managed under even-aged systems are managed on a rotation schedule, which may include standard or extended rotation lengths (see revised Forest Plan pp. 11-12). The rotation is the means by which the stands managed this way are regulated to ensure a sustainable yield, and so the rotation length dictates the proportions in each of the age classes. For instance, if you have a 100 year rotation, you cannot harvest more than 10 percent per decade to

maintain a sustained yield of products. If all stands were managed to this rotation, none would fall within the old age class because at 100 years they would be harvested to start the next rotation cycle. Some stands will include older trees, however, because extended rotations may be used. Consequently, the proportion identified in Table 2.2-2 for the old age class is an estimate reflecting the proportion of stands receiving even-aged management expected to be managed using extended rotations, or which may be deferred from harvesting for other reasons.

In the revised Forest Plan, the Oak-Hickory MA, which is where most even-aged management will occur, comprises 45 percent of forested lands (24% of Forest) on the FLNF. The remaining 55 percent of forested lands (30% of Forest) is likely to develop a much higher proportion of older trees over the long-term. A little more than half of this proportion in Future Old Forest, Research Natural Areas and candidates, Ecological Special Areas MAs, and unsuitable lands will develop old trees as a result of natural processes. In addition, based on a recent paper by Seymour et al. (2002), as referenced in the FEIS in section 3.5.1.1 under Indicator 3, forests managed using mainly uneven-aged silvicultural systems (the remainder of the 55%) result in forest structure comparable to those that develop under natural disturbance regimes, so old trees will be found frequently in these areas as well. See also response to 22000-19.

PC 22000-2: The Forest Service should reclassify the Wildlife Reserve Tree Objectives regarding mast producing species as Forest-wide guidelines to avoid compromising site conditions for aspen regeneration.

Response: A commenter expressed concern that an objective under proposed revised Forest Plan Goal 2 to “Manage mast-producing species to increase or expand mast productivity where practical" (revised Forest Plan p. 12) will lead to over-implementation of mast production to the detriment of other goals and objectives, particularly regeneration of aspen and other shade-intolerant species.

The revised Forest Plan includes direction for mast-producing species in Forest-wide and management area objectives, standards, and guidelines. Goals and objectives identify conditions and activities that the FLNF is working toward in order to achieve the desired future condition for the Forest (revised Forest Plan section 2.2.1). Objectives generally are accomplished by implementing projects or activities. Standards and guidelines are the specific guidance designed to achieve desired conditions, goals, and objectives in the revised Forest Plan (see section 2.3.1). The fact that mast-producing species are included in a specific objective does not grant them a higher-level priority that overrides goals and objectives for other management activities, such as increasing the percent cover of aspen, regenerating shade-intolerant species, minimizing adverse effects of non-native invasive species, or maintaining and restoring aquatic habitats. The Forest Service would not retain reserve trees in numbers or distribution that are counter-productive to specific objectives, such as aspen regeneration, the example cited by the commenter. See also response to PC 22000-11.

PC 22000-3: The Forest Service should revise the Forest-wide Age Class Objectives by removing long-rotation restrictions that conflict with the Forest-wide Habitat Composition and Structure Objective.

Response: The commenter feels that the current wording of the objective describing the use of extended rotations is too restrictive and can conflict with other objectives on composition for wildlife habitats. They recommend a change to make it clear that the objective is not meant to be restrictive. The language associated with rotation ages has been adjusted in the revised Forest Plan to clarify that they apply only to lands where timber production and other resource objectives together are desired (revised Forest Plan pp. 11-12). On such lands, which are considered suitable lands, long rotation ages may be applicable, and final determination will depend on what method best fulfills the objectives to achieve the desired future condition based on site-specific environmental analysis for the project area. On lands where timber production is not a factor involved in the desired future condition, rotation ages and harvest schedules do not apply. See also PC 22000-17.

PC 22000-4: The Forest Service should include cover-type age-class distributions as goal-related criteria to correct Forest-wide goals and objectives' insufficient characterization of wildlife habitat composition.

Response: The commenter is concerned that in the first objective under Goal 2, wildlife habitat is considered simply composition with reference to the composition objective table. They contend that age class structure is just as important to wildlife habitat, and the age class table should also be referenced appropriately. This objective has been clarified to indicate that both age class and composition are important to wildlife habitat, and both tables are referenced (revised Forest Plan p. 10).

PC 22000-5: The Forest Service should add a Forest-wide hunting and game habitat objective.

Response: The Forest Service did not include a separate objective for hunting and habitat for game species in the revised Forest Plan. Within the framework of seasons, limits, and other regulations administered by the New York State Department of Environmental Conservation, the Forest Service imposes very few restrictions to hunting on the FLNF. Goal 2 in the revised Forest Plan (p. 10) is to maintain and restore quality, amount, and distribution of habitats to support viable and sustainable populations of native and desirable non-native plants and animals. Objectives for maintenance and enhancement of habitats under this goal are equally applicable to game and non-game species of wildlife. Goal 11 in the revised Forest Plan (p. 15) is to provide a diverse range of high-quality, sustainable recreation opportunities that complement those provided off National Forest System lands. This range of recreational opportunities on the FLNF includes hunting in a wide range of settings, including those near roads, those accessed by trails, those in grasslands, and those in relatively remote forest areas. See also response to PC 21000-2.

PC 22000-6: The Forest Service should include a goal or guideline to remove diseased trees during timber and vegetation management activities.

Response: Forest-wide standards and guidelines allow for insect and disease control (revised Forest Plan p. 28). Removing diseased trees during timber and vegetation management activities is appropriate and in compliance with the revised Forest Plan. It is not appropriate to remove all diseased trees during timber and vegetation management activities. Snags, den trees, nest trees and mast trees will be retained in sufficient quantity, quality, and distribution to maintain well-dispersed, self-sustaining populations of all snag, den, nest, and mast dependent wildlife indigenous to the FLNF (revised Forest Plan pp. 25-26).

PC 22000-7: The Forest Service should include a goal or guideline requiring timber markers to be experts in forest health, insects, and disease pathology, and to mark when insects and disease are most evident.

Response: Forest Service Manuals and Handbooks that relate to forest health, insects, and disease pathology will be used to develop site-specific silvicultural prescriptions. Silvicultural treatments will be designed and/or approved by a certified silviculturalist (revised Forest Plan p. 21). The silvicultural prescriptions are incorporated into marking guides and are implemented by certified timber cruisers. The timber marking crew is trained to identify trees that are affected by insects and diseases.

PC 22000-8: The Forest Service should add standards and guidelines to protect existing and as yet unidentified wetlands, vernal pools, riparian areas, and other rare and outstanding ecological areas.

Response: Wetlands, seasonal (vernal) pools, and riparian areas, whether currently known or unknown, are protected under the revised Forest Plan by the following measures:

1. The Forest Service Manual provides several pages of mandatory direction for riparian area management and floodplain management and wetland protection. This direction was/is applicable to the Draft and revised Forest Plans. Highlights of this direction are:
    - Protect, manage, and improve riparian areas while implementing land and resources management activities.
    - Manage riparian areas in relation to various legal mandates, including, but not limited to, those associated with floodplains, wetlands, water quality, dredged and fill material, endangered species, wild and scenic rivers, and cultural resources. This includes application of State of New York Best Management Practices in areas where tree harvesting or livestock grazing is done.
    - Manage riparian areas under the principles of multiple-use and sustained-yield, while emphasizing protection and improvement of soil, water, and vegetation… Give preferential consideration to riparian-dependent resources when conflicts among land use activities occur.
    - Give special attention to land and vegetation for approximately 100 feet from the edges of all perennial streams, lakes, and other bodies of water. This distance shall correspond to at least the

recognizable area dominated by the riparian vegetation. Give special attention to adjacent terrestrial areas to ensure adequate protection of the riparian-dependent resources.
- Prohibit floodplain development and new construction in wetlands wherever there is a practicable alternative.
- Minimize destruction, loss and degradation of wetlands.

2. The Draft and revised Forest Plan standards and guidelines (S&Gs) require a protective strip adjacent to all wetlands, seasonal pools and streams (p. 18). The protective strip consists of predominantly undisturbed soil, and it separates soil-disturbing activities such as harvesting and trail construction from all water sources (streams, lakes, ponds, wetlands, and vernal or seasonal pools). The protective strip effectively minimizes or eliminates soil erosion and compaction in riparian areas and the possibility of stream sedimentation. The protective strip also contributes to maintaining flood water storage capacity, ground water recharge and storage, and minimizes the impacts to fish and wildlife habitats.
3. The revised Forest Plan provides additional protection for wetlands, seasonal pools, and riparian areas via other standards and guidelines (pp. 17-20, 24-25, and 27). These S&Gs work to minimize the effects of Forest Service management activities on plant and animal habitats, and ecological processes in these areas. A new guideline was also added that reads: “Within 100 feet of wetlands and seasonal pools, activities should be limited to those that protect, manage, and improve the condition of riparian and aquatic resources. Acceptable activities should be approved on a case-by-case basis” (revised Forest Plan p. 19). The wording of one standard was clarified and now reads: “Crossing wetlands with roads or trails should be avoided whenever possible” (revised Forest Plan p. 19).
4. Site-specific environmental analyses will be conducted for all projects implemented under the revised Plan. These analyses will include the direct, indirect, and cumulative water resource associated effects (including wetlands, vernal pools, riparian areas, and ecological special areas) from past, present, and foreseeable future management actions on National Forest System (NFS) and non-NFS lands. For each analysis, the Forest Service will determine whether additional resource measures (commonly called mitigation measures) are needed to protect or enhance the riparian and wetland resources, above and beyond the direction provided in the revised Plan S&Gs. Site-specific environmental analyses for complex projects commonly include additional riparian and/or wetland protection or enhancement measures.

Given the revised Forest Plan S&Gs and FSM direction, wetlands, seasonal pools, and riparian areas will be adequately protected under the revised Forest Plan. This has been clarified in the FEIS Soils section 3.2.2. See also response to PC 35000-1.

Regarding areas of ecological significance, all areas known to be of ecological significance have been allocated to management areas (MAs) designed to protect these features, including Future Old Forest, Ecological Special Areas,

and candidate Research Natural Areas (see also Section 3.10 of the FEIS, particularly Table 3.10-7). Areas that may be discovered in the future are protected by the second standard under Rare and Unique Biological Features, Threatened, Endangered, Proposed, and Sensitive Species and Rare and Exemplary Natural Communities (revised Forest Plan pp. 26-27); such areas can also be allocated to protective MAs through a Forest Plan amendment.

PC 22000-9: The Forest Service should add standards, guidelines, monitoring efforts, and/or desired future conditions to assess and protect late successional and old forest habitat, regardless of management area designation.

Response: See response to PC 62000-1.

PC 22000-10: The Forest Service should include additional North Country National Scenic Trail Special Area standards and guidelines that provide a wider timber harvest exemption corridor or prohibit harvest plans that allow vulnerable trees to fall on the trail.

Response: The commenter is concerned that the 400 foot width of the North Country National Scenic Trail Special Area MA is not wide enough to protect the trail from possible fallen trees and increased vegetation growth from sudden canopy openings. The Forest Service has increased and made more uniform the width of the North Country National Scenic Trail corridor from the 1987 Plan. The 1987 Plan dictated certain activities within certain distances of the trail, such as maintaining continuous forest cover within 100 feet of the trail. The Forest Service believes the uniform, and in some cases wider, trail corridor in the revised Forest Plan is adequate to maintain the trail and protect the trail experience. None of the trees in the region are tall enough to fall onto the trail from a distance of 200 feet. In addition, Forest-wide visuals standards and guidelines (revised Forest Plan pp. 32-33) will further protect the scenic trail experience, in some cases farther than the 200-foot corridor width.

Finally, decisions regarding specific timber management projects near the trail will be made using a site-specific environmental analysis with opportunities for public involvement.

PC 22000-11: The Forest Service should revise Wildlife Reserve Tree Standards to insure habitat improvement for early-successional wildlife species is not compromised by excessive retention of mature trees/basal area.

Response: The Forest Service modified standards and guidelines for wildlife reserve trees from the proposed revised Forest Plan by incorporating features used by the White Mountain and Green Mountain National Forests (see revised Forest Plan section 2.3.8, pp. 25-27). A primary feature of these modifications is for retention of uncut patches of trees totaling five percent of the harvested area during even-aged management (when harvest reduces the basal area of a stand below thirty square feet per acre). Incorporating a basal area threshold should make this standard easier to implement during timber harvest operations. Retained trees should emphasize, to as great an extent as possible, nest or den tees, trees with exfoliating bark, snags greater than or equal to eight inches diameter at breast height (dbh), other trees with cavities or broken tops, and mast-producing trees and shrubs. Guidelines also provide

that patches of retained trees should be located along the edge of openings or riparian corridors where possible. These modifications are compatible with other resource objectives, as the Forest Service would not retain reserve trees in numbers or distribution that are counter-productive to specific project objectives, such as regeneration of shade-intolerant tree species and creation of early successional habitat. These changes are included in the FEIS section 3.6.1 under Proposed Changes in Management Direction Common to All Alternatives. See also response to PC 22000-2.

PC 22000-12: The Forest Service should revise direction in the Future Old Forest Management Area to allow the forest to grow as naturally as possible while allowing low-impact removal of trees infected with non-native insects or disease.

Response: The commenter is concerned that the management direction for the Future Old Forest Management Area (MA) is not clear in providing for the removal of trees infected with non-native insects or diseases, and that this work should be done in as low-impact a method as possible. The revised Forest Plan states on page 51 of the Future Old Forest Desired Future Condition that "Changes in vegetation will predominantly be the result of natural processes" and that "Under some circumstances, management actions that further ecological goals and objectives in this MA may be appropriate." It then goes on to list examples, and states that "Ecological restoration within these areas may occur through control of non-native invasive species…" The language regarding "minimum managerial controls," which was included to indicate that activities were to have low impacts, was reworded in the revised Forest Plan to read: "Management activities will be designed to maintain ecological and social conditions consistent with those desired for the management area" (revised Forest Plan p. 51). A site-specific environmental analysis will evaluate the effects of any proposed management action associated with non-native invasive species (NNIS) and will determine if the action is consistent with the desires for this MA. In addition, under the guidelines for Timber or Vegetation Management for this MA, the control of NNIS was added to the list of reasons for management actions in order to be consistent with the desired future condition language (revised Forest Plan p. 52).

PC 22000-13: The Forest Service should define what activities could support the value of the Future Old Forest Management Area in regards to vegetation manipulation and fire management.

Response: Management activities that are allowed or prohibited from the Future Old Forest Management Area (MA) are defined in the revised Forest Plan under Management Area Direction on pages 51-53. The second paragraph of the Desired Future Condition includes some examples of the types of management activities that could occur in this MA. In addition, the standards and guidelines for Vegetation Management and Fire provide further details on management activities that might occur. The idea with this MA is to minimize activities, but not prohibit those needed for basic stewardship needs, such as NNIS control or habitat management for listed or rare species. The MA also provides opportunities to restore native ecosystems by converting plantations of non-native species to native species, and the Forest Service wanted to ensure that could happen. In some portions of this MA, the natural

vegetation suited to the soils and present prior to European settlement would have included oak and pine. In those areas, fire was used for centuries by Native Americans to maintain more open understory conditions (FEIS Fire section 3.16.1). In the context of the natural range of variation and natural disturbance regimes, fire was an important part of these communities (DEIS p. 3-54). Consequently, in those places where oak and pine are best suited, fire may be used periodically, based on a site-specific management plan for its use, to perpetuate these communities.

PC 22000-14: The Forest Service should revise the Grasslands for Wildlife Management Area to protect avian grasslands by including standards and guidelines that require mowing on a three-year rotation, prohibit burning and hay harvesting, and encourage greater than ten acre parcels for bird grasslands.

Response: The revised Forest Plan includes objectives under Goal 2 (revised Forest Plan, p. 10) to provide quality grassland habitat for those wildlife species that depend on it. While identifying the need for regular maintenance of lands in the Grassland for Wildlife MA, the Forest Service did not include specific direction on tools and schedules for maintenance to allow flexibility for developing site-specific management for individual grasslands. Building up soil, altering the distribution or abundance of particular plant species, and control of non-native invasive species (NNIS) are examples of situations that may call for different maintenance schedules and applications. In some cases, mowing vegetation and leaving it on the ground may be the most appropriate procedure. In other cases, burning or removal of cut vegetation may be most appropriate (NCCES 1991, Mullins 2001, MAS 2003-2005, Snyder 2003). Indicator 1 for wildlife and wildlife habitat in the FEIS (section 3.6) analyzes acres of grassland habitat provided by alternatives to the revised Forest Plan.

The Forest Service does not include a minimum size for lands allocated to the Grassland for Wildlife MA, although it does acknowledge that size of grasslands can be important. Species like the Henslow's sparrow and upland sandpiper, in particular, fare best in expanses of grassland of 75 acres or more, whereas other species, like horned lark, vesper sparrow, and savannah sparrow flourish in much smaller areas (Mitchell et al. 2000). Allocation of lands on the FLNF is complicated by the patchiness, size, and shape of National Forest Service lands, as well as the current uses on those parcels. Lands covered in forest or shrubs, and those with extensive existing facilities for grazing (such as fences and stock ponds) are not appropriate for allocation to Grassland for Wildlife MA. Land use on adjacent parcels also influences the quality and effective size of habitat on grasslands, although the Forest Service typically has limited ability to influence these off-Forest activities. In short, the Selected Alternative allocates lands to the Grassland for Wildlife MA to the largest and most appropriate parcels as possible while considering the constraints from existing site conditions and other land management objectives (DEIS pp. 3-109-110).

PC 22000-15: The Forest Service should add standards to the Oak Hickory and Northern Hardwood Management Areas to allow for flexibility in maintaining ecological tendencies toward other forest types.

Response: See response to PC 11000-2.

PC 22000-16: The Forest Service should clarify the extent of intended use of even-aged silvicultural systems as the Forest-wide standards suggest an over-emphasis of utilizing these methods.

Response: The SPECTRUM model was used as a tool to help develop programmatic timber harvest schedules for each alternative (FEIS section 3.11.2). The acres treated by various harvest methods, mix of management strategies, and the potential to support other related management objectives, such as wildlife habitat management, are some of the outputs compared across the alternatives. The objective under Goal 2 in the revised Forest Plan has been changed to show uneven-aged methods to be applied on a minimum of 20 percent of lands suitable for timber management (revised Forest Plan p. 11). The SPECTRUM model predicts that at least 41 percent of the average annual harvesting between 2005 and 2014 (FEIS Table 3.11-5 and revised Forest Plan Appendix D, Table D-4) will consist of uneven-aged silviculture (selection harvesting). The Northern Hardwoods Management Area will emphasize management for shade-tolerant tree species; often utilizing uneven-aged silvicultural techniques (revised Forest Plan p. 48 and DEIS p. 3-58). Exceptions in areas managed for species such as oak, aspen, and locust will occur. A total of 2,189 acres (13%) has been allocated to the Northern Hardwoods Management Area in the Selected Alternative (FEIS Table 2.1-3). The Oak Hickory Management Area will emphasize management for shade-intolerant tree species; often utilizing even-aged silvicultural techniques (revised Forest Plan p. 49 and DEIS p. 3-58). Exceptions in areas managed for species such as northern hardwood and hemlock will occur. A total of 4,036 acres (25%) has been allocated to the Oak Hickory Management Area in the Selected Alternative (FEIS Table 2.1-3). See also response to PC 11000-2.

PC 22000-17: The Forest Service should clarify the parameters for implementing extended rotation ages during timber sales.

Response: Goal 2 of the revised Forest Plan (p. 11) will provide “for an increase of late successional and old forest habitats” within lands not suitable for timber production and through the use of extended rotations for lands suitable for timber production. The language associated with rotation ages has been adjusted in the revised Forest Plan to clarify that they apply only to lands where timber production and other resource objectives together are desired (revised Forest Plan pp. 11-12). Long rotation ages may be applicable on suitable lands and final determination will depend on what method best fulfills the objectives to achieve the desired future condition based on site-specific environmental analysis for the project area. On lands unsuitable for timber production, rotation ages and harvest schedules do not apply. Natural processes will occur on lands not managed for timber and older stands will occur overtime. Known old growth areas are protected through Forest-wide standards and guidelines and/or have been allocated to Ecological Special Areas, Future Old Forest, unsuitable lands, and cNRA MAs. See also responses to PC 22000-3 and PC 62000-1.

PC 22000-18: The Forest Service should include monitoring results in the Final EIS regarding the adequacy of, or need for modification of timber area buffer strip widths.

Response: The Forest Service acknowledges that the adequacy of buffer strip widths was not addressed in detail in the DEIS. The overall adequacy of timber harvesting Best Management Practices (BMPs) and standards and guidelines were addressed in the DEIS (p. 3-22). The Forest Service believes that monitoring of management activities implemented during the past planning period has shown that the protective (or buffer) strip widths in the revised Forest Plan are adequate for these reasons:

1. The revised Forest Plan includes a guideline that calls for the Forest Service to follow New York's BMPs for timber harvesting (revised Forest Plan p. 19). These guidelines call for buffer strips that exceed the widths of the Protective Strip in the revised Plan standards and guidelines (S&Gs) (revised Forest Plan p. 18, second standard). "Best Management Practices implemented in the State of New York and the Northeast have repeatedly been shown to be effective in keeping adverse effects to the soil and water resources at low levels (New York State Dept. of Environmental Conservation 2004, Irland and Connors 1994, Martin and Hornbeck 1994)" (DEIS p. 3-22) The Forest Service also stated in the DEIS (p. 3-22) that "Best Management Practices and S&Gs have been shown to be effective in keeping the soil impacts at low levels on the FLNF (USDA , Forest Service 1999d, USDA, Forest Service 2001d, USDA, Forest Service 2003q)." The documents cited are annual FLNF Monitoring and Evaluation Reports.
2. Forest Service monitoring results in past timber harvest areas on the FLNF show that buffer strips provide adequate width to protect water quality. The Forest Service did state in the DEIS (p. 3-22) that "Low levels of adverse effects to soil and water resources were observed, for example, on a field visit to the Teeter Timber Sale in the spring of 2002. Erosion was minor, and no sedimentation was entering streams (USDA, Forest Service 2002a)."

Many types of wetlands have no protection under New York's BMPs for harvesting. In the revised Forest Plan, all wetlands and seasonal pools are protected by several standards and guidelines (see response to PC 22000-8), including the Protective Strip (revised Forest Plan p. 18).

PC 22000-19: The Forest Service should revise or remove the Plan objective that considers trees over 100 years old as "over mature" and in need of harvesting.

Response: There are no objectives in the proposed or revised Forest Plan that describe trees over 100 years old as "over mature." The age class objectives defined in the revised Forest Plan apply only to stands within the Oak Hickory or Northern Hardwood Management Areas, and then only to those stands where even-aged silvicultural systems are used, which will mainly occur in the Oak Hickory MA (revised Forest Plan p. 11). Further clarification of this point has been made in the revised Forest Plan (p. 11) and the FEIS (section 3.5.1.1). In these places of even-aged management, stands of trees over 100 years old are considered "old." Everywhere else on the Forest, the age of the stand is not the primary way in which trees are identified for harvesting. Other

objectives associated with uneven-aged silviculture, wildlife habitat, recreation needs, or ecological needs, for example, are what drive the determination of when trees are harvested.

The use of 100 years as an age at which to regenerate a forested stand is based on forestry research and practice in Northeastern forests conducted over the last several decades. To regenerate a stand means to harvest the trees in the stand that will provide valuable forest products, leaving some trees for wildlife and seed sources for the next forested stand that will take its place (Smith 1986, p. 14). In even-aged management systems, stands are regulated through a rotation age which defines the age at which a stand will be regenerated. Smith (1986) notes that "Stands of trees are not immortal. In most situations there is an optimal size and age to which trees should be grown. The period of years required to grow a stand to this specified condition of either economic or natural maturity is known as the rotation" (p. 5). Experience in forest management in the Northeast over the last several decades has indicated 100 to 120 years as the optimal age to which typical northern hardwoods should be grown, where economic value is balanced against management costs and risks. Consequently, this age is used as the rotation age for forests where timber production is the primary objective. It also provides for a straightforward way to regulate a forest managed using this system through regenerating 10 percent of the forest each decade. The revised Forest Plan identifies options for the use of extended rotations where other ecological or social values are as important as timber production (pp. 11-12). In these cases, the rotation ages are extended toward the maximum ecological age for major tree species in the Finger Lakes region, between 200 to 300 years. While trees in stands where extended rotations will be used will continue to add value by adding more wood to the bole, some trees face a higher risk of death due to exposure to insects, disease, and weather events, and management costs continue to accrue as these stands continue to be managed through thinnings and other intermediate treatments. As a result, the revenue gained through harvesting at the end of an extended rotation may be near or lower than management costs, which explains why these rotations are not standard forestry practice where timber production is the primary emphasis. On national forests, however, there exists an opportunity to emphasize other values associated with managed forest stands using extended rotations, as well as the opportunity to experiment with these rotations to help determine the economic feasibility of this practice. See also response to 22000-1.

Alternatives (23000)

PC 23000-1: The Forest Service should develop an alternative that designates species-diverse wetlands as Research Natural Areas or Ecological Special Areas or encompasses them within the Future Old Forest Management Area.

Response: Two areas have been identified by commenters that have high diversity in odonate (dragonfly and damselfly) species. This data was not available to the Forest Service during the development of alternatives. These areas were identified as unique among all wetlands and ponds inventoried on the Forest for odonate species. Consequently, these areas meet criteria for designation as Ecological Special Areas or for inclusion within Future Old Forest MA. One area, a pond known as the "maple-stonewall pond" by the

surveyors, falls within the North Country National Scenic Trail Special Area (NCT MA), which encompasses it in its entirety. Because this trail has national significance, and because it has been the approach during alternative development not to have overlapping management area designations, the Forest Service did not change the designation of this area of ecological importance. The Forest Service has added language to the Desired Future Condition for the NCT MA to emphasize that the unique characteristics and values associated with areas of ecological importance will be protected and maintained in this MA (revised Forest Plan p. 54). The Future Old Forest MA allocation was expanded south of Mathews Road to include areas of older forest, and was extended to include the second area of high odonate diversity, a wetland east of the Gorge Ponds. See also response to 62000-1.

PC 23000-2: The Forest Service should develop an alternative with larger, contiguous Future Old Forest MA parcels and/or Future Old Forest MAs connected by corridors that are 100 meters in width minimum.

Response: The Forest Service modified Alternative 3 to accommodate more contiguous Future Old Forest parcels and greater connectivity among the parcels. Two commenters suggested alternative configurations of the Future Old Forest areas to meet these conditions. The Forest Service evaluated this set of alternatives and decided to modify Alternative 3 in response as noted above, eliminating the new alternative set from detailed analysis. Further discussion of these alternatives considered but eliminated from detailed study can be found in Section 2.1.6 of the FEIS, and in Burbank (2006). See also response to PC 62000-1.

PC 23000-3: The Forest Service should not select Alternative 1.

SC 23000-3a BECAUSE PREVIOUS MANAGEMENT WAS NOT BASED ON BEST SCIENCE AND MANAGEMENT PRACTICES

SC 23000-3b BECAUSE THE PUBLIC WAS NOT SATISFIED WITH PREVIOUS MANAGEMENT

Response: The Forest Service analyzed three alternatives with different outcomes and with varying management area allocations, addressing Forest Plan revision issues (see FEIS Chapter 3). Each alternative meets the intent of relevant laws under which the national forests are managed. The Regional Forester considered all of the alternatives, and the Record of Decision (ROD) describes his rationale for the Selected Alternative. In his decision, the Regional Forester considered the trade-offs among alternatives, and weighed ecological, economic, and social concerns. The Selected Alternative represents what the Forest Service believes to be the best balance of outcomes and services that will maintain sustainable ecosystems, meet the intent of relevant laws, and address the issues and concerns specific to the FLNF.

PC 23000-4: The Forest Service should select Alternative 2.

SC 23000-4a TO ENHANCE ECOLOGICALLY SOUND, SCIENCE-BASED MANAGEMENT

SC 23000-4b TO MAXIMIZE FUTURE OLD FOREST DESIGNATIONS AND OPPORTUNITIES TO EXPERIENCE REMOTENESS

SC 23000-4c TO MINIMIZE AREAS ALLOWING HUMAN DISTURBANCE AND DEVELOPMENT SUCH AS VEGETATION MANAGEMENT AND WIND POWER OR GAS DEVELOPMENT

SC 23000-4d TO MAXIMIZE ACREAGE MANAGED UNDER UNEVEN-AGED SILVICULTURAL SYSTEMS

SC 23000-4e TO MAXIMIZE CONTIGUITY OF OLD AND MATURE FOREST COMMUNITIES OR MIXED HARDWOOD FOREST TYPES

SC 23000-4f TO EMPHASIZE RESTORATION ACTIVITIES OF FORESTED AREAS, ECOSYSTEMS, AND OLD GROWTH CONDITIONS

SC 23000-4g TO MINIMIZE MOTORIZED RECREATION, SUCH AS SNOWMOBILES AND SUMMER ORVS, AND INCREASE NON-ECONOMIC BENEFITS

SC 23000-4h TO MAXIMIZE RESEARCH AND EDUCATIONAL OPPORTUNITIES

SC 23000-4i TO MAXIMIZE OPPORTUNITIES FOR NATIVE VEGETATION TO THRIVE BY MINIMIZING POTENTIAL EFFECTS FROM NON-NATIVE INVASIVE SPECIES

SC 23000-4j TO IMPROVE CONDITIONS FOR THREATENED, ENDANGERED, OR AT-RISK SPECIES, THUS POTENTIALLY INCREASING LOCAL BIODIVERSITY

SC 23000-4k TO MINIMIZE OPPORTUNITIES FOR FUTURE PRIVATIZATION

SC 23000-4l TO PROTECT WATERSHEDS

SC 23000-4m TO MINIMIZE POTENTIAL EFFECTS ON HERITAGE RESOURCES

SC 23000-4n BECAUSE IT IS AN ECONOMICALLY SUSTAINABLE ALTERNATIVE, DEMANDS FEWER FINANCIAL RESOURCES, AND WILL NOT HURT THE LOCAL ECONOMY

Response: The Forest Service analyzed three alternatives with different outcomes and with varying management area allocations, addressing Forest Plan revision issues (see FEIS Chapter 3). Each alternative meets the intent of relevant laws under which the national forests are managed. The Regional Forester considered all of the alternatives, and the Record of Decision (ROD) describes his rationale for the Selected Alternative. In his decision, the Regional Forester considered the trade-offs among alternatives, and weighed ecological, economic, and social concerns. The Selected Alternative represents what the Forest Service believes to be the best balance of outcomes and services that will maintain sustainable ecosystems, meet the intent of relevant laws, and address the issues and concerns specific to the FLNF.

PC 23000-5: The Forest Service should not select Alternative 2.

SC 23000-5a BECAUSE THE REDUCTION OF AREAS THAT ALLOW TIMBER HARVESTING AFFECTS THE LOCAL ECONOMY AND MANAGERS' ABILITIES TO MANIPULATE ECOSYSTEMS AND PROVIDE DIVERSITY

SC 23000-5b BECAUSE IT DESIGNATES TOO MUCH OF THE FUTURE OLD FOREST MANAGEMENT AREA AND PROVIDES TOO MUCH CLOSED CANOPY FORESTS

Response: The Forest Service analyzed three alternatives with different outcomes and with varying management area allocations, addressing Forest Plan revision issues (see FEIS Chapter 3). Each alternative meets the intent of relevant laws under which the national forests are managed. The Regional

Forester considered all of the alternatives, and the Record of Decision (ROD) describes his rationale for the Selected Alternative. In his decision, the Regional Forester considered the trade-offs among alternatives, and weighed ecological, economic, and social concerns. The Selected Alternative represents what the Forest Service believes to be the best balance of outcomes and services that will maintain sustainable ecosystems, meet the intent of relevant laws, and address the issues and concerns specific to the FLNF.

PC 23000-6: The Forest Service should select Alternative 3.

SC 23000-6a TO CONTINUE PROVIDING SUSTAINABLE FORESTRY

SC 23000-6b TO BALANCE NORTHERN HARDWOOD AND OAK FORESTS CLOSER TO THE ECOLOGICAL TENDENCY

SC 23000-6c TO PROVIDE DIVERSITY AND ACCEPTABLE AGE-CLASS DISTRIBUTIONS

Response: The Forest Service analyzed three alternatives with different outcomes and with varying management area allocations, addressing Forest Plan revision issues (see FEIS Chapter 3). Each alternative meets the intent of relevant laws under which the national forests are managed. The Regional Forester considered all of the alternatives, and the Record of Decision (ROD) describes his rationale for the Selected Alternative. In his decision, the Regional Forester considered the trade-offs among alternatives, and weighed ecological, economic, and social concerns. The Selected Alternative represents what the Forest Service believes to be the best balance of outcomes and services that will maintain sustainable ecosystems, meet the intent of relevant laws, and address the issues and concerns specific to the FLNF.

PC 23000-7: The Forest Service should develop an alternative that makes oil and gas resources unavailable for leasing.

Response: Lands on the FLNF are withdrawn from oil and gas leasing under the Energy Policy Act of 2005. Language was added to the 2006 Forest Plan to recognize that oil and gas development is currently prohibited under all alternatives (revised Forest Plan p. 20).

Natural Resources Management (30000)

PC 30000-1: The Forest Service should replace ecological "restoration" and "recovery" language with management direction that recognizes a state of ecological flux and inabilities to attain hypothetical pre-Colonial conditions.

Response: One commenter was concerned that the language used in the DEIS effects analysis regarding restoration suggested that the Forest Service believed ecosystems were static, and the commenter contends that there is no scientific basis for recognition of an ecological condition to which an ecosystem could be restored, due to the constant change in ecosystems. Another commenter was concerned that the Forest Service should be managing stands based on what is growing there now, and what can optimally grow there based on soil conditions.

The discipline of ecological restoration is a scientifically recognized discipline, most notably in association with the professional Society for Ecological Restoration International, and their scientific, peer-reviewed journal, *Restoration Ecology*, in publication since 1993. Ecological restoration is simply "the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed" (SER 2004).

The concept of ecological restoration inherently recognizes that ecosystems are dynamic. The development of ecosystems through successional stages has long been recognized. Although the notion of climax conditions (an end-point to succession) is no longer scientifically defensible, the trajectory of an ecosystem's composition and structure as it develops under natural disturbance regimes can be predicted over time. Recognition of major forest types, such as mesic hardwoods and oak-hickory, suggests a basic if intuitive recognition of inherent tendencies of ecosystems. Ecosystems can and have been named, based on their potential natural vegetation. Classifications of such ecosystems form the basis for managing the national forests, as they are required by policy on all federal lands managed by the Forest Service. The reason ecosystems are described, named, and evaluated in terms of current compared to potential natural conditions has to do with ecological sustainability. When ecosystems experience disturbances and fluctuations similar to those experienced historically, they tend to become resilient over time in responding to these changes. Species evolve adaptations that allow them to bounce back from such disturbances. When fluctuation or disturbance patterns suddenly change, dramatic changes in species composition and ecosystem structure can occur. If dramatic enough, such disturbances can cause ecosystems to simplify or collapse, accompanied by a loss of biological diversity. Ecosystems that have experienced dramatic changes in disturbance patterns are those that benefit from restoration (DEIS pp. 3-41-43). As described in the Vegetation section 3.5 of the FEIS, ecosystems in the Finger Lakes regions and on the Forest have experienced dramatic changes in disturbance patterns during the period of colonization and agriculture. More details regarding the basis for evaluating ecosystems in the context of historical disturbance patterns can be found in section 3.1.4 of the FEIS regarding ecosystem management.

The Forest Service believes that stands should be managed according to what is there now and their potential, and that is a key part of ecologically sustainable management Steve DeGloria's (1998) research on ecological landtypes and landtype associations were important in developing composition objectives and in management area allocation (DEIS pp. 3-41-43). The objective under revised Forest Plan Goal 2 (p. 10) that says: "Maintain northern hardwood forests, native softwood forests, and forests of oak, hickory, and pine, on sites that ecologically support these habitats," as well as other objectives associated with Goal 2, recognize inherent ecological potential of stands as well as current composition, and will be used in making site-specific management decisions regarding desired composition and management practices to achieve those goals.

Management Indicator Species (32200)

PC 32200-1: The Forest Service should standardize Management Indicator Species (MIS) monitoring protocols to allow comparison with other regional survey data.

Response: The Forest Service selected six MIS for the FLNF revised Forest Plan: black-throated blue warbler (contiguous forest habitat); chestnut-sided warbler (age 0-9 deciduous trees); gray squirrel (oak-hickory); ruffed grouse (aspen); common yellowthroat (shrubland); and an assemblage of birds (bobolink, eastern meadowlark, savannah sparrow: grassland) (see FEIS section 3.6.1 and revised Forest Plan Appendix C). [Note: The selection of an assemblage of bird species as an MIS for grassland in the revised Forest Plan represents a departure from the proposed Forest Plan. See responses to PC 32200-4 and PC 32200-5.]

The revised Forest Plan Chapter 4 provides for monitoring of MIS in Table 4.1-5. The Forest Service will monitor MIS on the FLNF in cooperation with State and federal agencies, contractors, and other partners with appropriate expertise. For all MIS, the Forest Service will use widely accepted, standardized protocols, allowing comparison of results, to the greatest extent possible, with those collected in other areas. Separation of Forest Service management effects from effects of weather, migration, wintering habitat, hunting, or any other factors that can influence MIS is among the challenges related to the MIS process, and one to be addressed in protocols applied for surveying and sampling. Various controls must be integrated into the survey design to separate management effects from other factors. The Forest Service will develop a more detailed Monitoring Implementation Guide to accompany Chapter 4 of the revised Forest Plan (see responses under PC 22000-43). The commenter's suggestion for survey control areas will be considered as this monitoring implementation guide is developed
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PC 32200-2: The Forest Service should institute survey control areas in known MIS habitat areas to determine the efficacy of management actions.

Response: See response to PC 32200-1.

PC 32200-3: The Forest Service should consider utilizing the technical expertise and assistance of the Ruffed Grouse Society when conducting monitoring or management actions related to MIS.

Response: The Forest Service routinely coordinates or consults with State and federal agencies and other organizations and groups as appropriate on proposed habitat management activities, management decisions, and other activities that might affect terrestrial and aquatic habitats. To emphasize this coordination and consultation the Forest Service added the following additional Forest-wide guideline to the wildlife section 2.3.8 (revised Forest Plan p. 25):

> "Wildlife habitat management should be coordinated with the US Fish and Wildlife Service (USFWS), the New York State Department of Environmental Conservation (NYSDEC), and other agencies or organizations as necessary."

The coordination and consultation referred to above includes MIS monitoring. The Forest Service welcomes contributions of direct assistance and technical expertise from individuals and from organizations such as the Ruffed Grouse Society.

PC 32200-4: The Forest Service should revise the grassland MIS to be meadowlark, bobolink, Henslow's sparrow, or upland sandpiper because the American woodcock is not a grassland bird.

Response: The Forest Service acknowledges that the woodcock uses other habitats extensively (see response to PC 32200-5) and that other species are more appropriate for selection as MIS for grassland. The Forest Service changed the MIS for grassland in the revised Forest Plan to an assemblage of grassland birds: bobolink, eastern meadowlark, and savannah sparrow. Each of these birds inhabits and nests in grasslands almost exclusively (Wheelwright and Rising 1993, Lanyon 1995, Martin and Gavin 1995, Mitchell et al. 2000, USFS 2003c). The FEIS has been modified to reflect these changes (FEIS section 3.6).

Ongoing bird studies on the FLNF and breeding bird surveys in New York State provide background population trend information for each species. The Forest Service did not select upland sandpiper and Henslow's sparrow for several reasons. The upland sandpiper is not known to nest on the FLNF at present, but does occur within dispersal distance. Suitable habitat is available and secure on the FLNF but the species is known only as migrant. Henslow's sparrow does nest on the Forest, and suitable habitat is available and secure on FLNF. For both species, range-wide loss of habitat is a critical problem, and managed habitat on public lands may not be enough to offset regional trends (Mitchell et al. 2000, USFS 2003a, 2003b, SVE Bird Panel 2003). Thus, population trends may be affected more by habitat loss and other actions off-Forest than by Forest Service management actions.

PC 32200-5: The Forest Service should retain the American woodcock as the MIS for grassland habitat with the understanding that grassland habitat alone will not guarantee the presence or absence of the species.

Response: A commenter appreciated the choice of American woodcock as MIS for grassland, with a caution against narrow interpretation of habitat needs. In particular, availability and quality of nesting and brood-rearing habitat adjacent to singing grounds may be a more important factor in determining presence of woodcock than the actual characteristics and suitability of the singing habitat itself. In selecting the American woodcock as MIS for grasslands for the proposed revised Forest Plan, the Forest Service acknowledged that the woodcock uses open fields as singing grounds, relying on other habitat types extensively for nesting and brood rearing (Sepik et al. 1993, Dessecker and McAuley 2001, USFS 2003d). Based on comments from Forest Service staff, other biologists that participated in the Forest Plan revision process, and from the public (this comment and PC 32200-4), the Forest Service replaced American woodcock with an assemblage of grassland birds as MIS that are linked more directly to grassland habitat: bobolink, eastern meadowlark, and savannah sparrow (see response to PC 32200-4).

Selection of other grassland birds as MIS for grasslands in place of American woodcock in no way diminishes the importance of woodcock on the FLNF. The Forest Service acknowledges that many resource management and conservation groups identify woodcock and woodcock habitat as regional resource concerns. The North American Breeding Bird Survey (Sauer et al. 2003) and singing ground surveys coordinated by the US Fish and Wildlife Service (Kelly 2004, Kelly and Rau 2005) describes a population decline for New York State and for the Northeast in general from 1966 to 2003, whereas New York Breeding Bird Atlas (NYDEC 2005) presents no obvious trend from 1985 to 2000 (DEIS p. 3-106). The Partners in Flight program and The Nature Conservancy identified a high level of concern for the American woodcock (TNC 2002, Dettmers and Rosenberg 2003, Robertson and Rosenberg 2003). As the commenter pointed out, woodcock are a species of concern and are currently the focus of a regional habitat initiative by the Wildlife Management Institute, the US Fish and Wildlife Service and other partners (WMI 2005). The revised Forest Plan emphasizes grassland and shrubland habitats; management that should provide, maintain, and enhance habitat for singing grounds, nesting, and brood rearing for woodcock. This emphasis will, in turn, also provide benefits to other species that inhabit grasslands and shrublands (see FEIS sections 3.6, Wildlife and Wildlife Habitat, and 3.8 Species of Potential Viability Concern).

PC 32200-6: The Forest Service should retain the ruffed grouse as the MIS for disturbed and open upland habitat types with the understanding that aspen habitat alone will not guarantee the presence or absence of the species.

Response: The Forest Service understands that ruffed grouse occur in many habitat types, including those with little or no aspen, particularly in the Northeast. Aspen, however, is a common component of many habitats that are suitable for grouse (Gullion 1984, DeGraaf and Yamasaki 2001, DeStefano et al. 2001) (DEIS p. 3-107). Productive management of aspen where it is a natural component of the species composition on forested lands can be very productive and beneficial for ruffed grouse. The goal of such management is to provide a diversity of age classes of aspen to meet the food and cover requirements of these birds, in a manner consistent with their limited mobility (DeStefano 2001, RGS 2003). The Forest Service acknowledges that parcel size, age class, and structural diversity of aspen stands are important factors that contribute to the overall suitability of habitat for ruffed grouse (DeStefano 2001, RGS 2003). Under the revised Forest Plan, the Forest Service proposes to enhance the quality, including age and structural diversity, and quantity of aspen on the FLNF, which is why the Forest Service selected ruffed grouse as MIS for aspen.

PC 32200-7: The Forest Service should revise the Final EIS to indicate that ruffed grouse can serve as MIS for "healthy" aspen habitat to recognize that other forest types may provide more suitable habitat for the species than unsuitably small or uniformly mature aspen stands.

Response: See response to PC 32200-6.

PC 32200-8: The Forest Service should retain the Chestnut-sided warbler as MIS.

Response: The Forest Service appreciates feedback for selection of the chestnut-sided warbler as MIS for young (age 0-9 years) deciduous trees. As described in the section 3.6 of the DEIS (p. 3-107), this warbler is strongly associated with early successional, deciduous woods (Richardson and Brauning 1995, DeGraaf and Yamasaki 2001, CLO 2004) and has proven to be an effective indicator species for this habitat type (Toth 2000).

Non-native Invasive Species (32300)

PC 32300-1: The Forest Service should address insect, disease, and microbe non-native invasive species and other natural mortality as threats to the future health of the FLNF.

Response: The Forest Service agrees with the comment that non-native invasive species (NNIS), including insects and disease pathogens, pose a potential threat to eastern forests, including the FLNF. The commenter is concerned that the revised Forest Plan does not specifically address NNIS that are insects or diseases (including microbial diseases). The Forest Service believes that NNIS that are insects and diseases are adequately addressed in the revised Forest Plan. On page 28 of the revised Forest Plan, under Standards and Guidelines for Forest Health and Disturbance Processes, a standard states: "Non-native insect and disease pathogens shall be managed using appropriate biological, silvicultural, or chemical controls. Chemical controls shall only be used when other methods are ineffective." In addition, much of the language related to NNIS in the Standards and Guidelines for Forest Health and Disturbance Processes is not specific to plants, but is inclusive of all NNIS such as insects, disease, and animals. All six standards except the fourth, and all six guidelines except the third through fifth, address all NNIS. NNIS are further defined in the Glossary as including all organisms (revised Forest Plan p. 99).

Wildlife/Fish Management (32500)

PC 32500-1: The Forest Service should consider applying the highest values proposed in the desired ranges for Composition and Age Class Objectives to mitigate past deficits in regeneration habitat outputs.

Response: The amount of regenerating forest habitat provided by the revised Forest Plan was based on the need to balance the desire to maintain and enhance shrubland and to create regenerating forest stands. This includes the desire to mitigate shortfalls in maintaining regenerating forest habitat under the 1987 Forest Plan. Every effort will be made to achieve composition and age class objectives in the revised Forest Plan. Constraints on providing this habitat on the Forest include those of budgets and staff, as well as the need to maintain a non-declining yield of timber.

The revised Forest Plan (Appendix D, Proposed and Probable Practices) identifies a desire to substantially increase the amount of non-commercial creation of aspen habitat. This will also increase the quantity of early successional habitat. The FEIS describes the effects of the alternatives in

providing these non-commercial opportunities, and how each alternative contributes toward the abundance of this habitat (FEIS section Vegetation section, Indicators 1 and 2. Consequently, the amount of regenerating forest habitat actually created on the Forest will depend greatly on the ability of the Forest Service to work with partners and volunteers to create and sustain this habitat non-commercially.

PC 32500-2: The Forest Service should clarify that the proposed Age Class Objectives apply across all FLNF forested acreage, not just acres available for commercial harvest or vegetation management.

Response: Several responses address comments about age class objectives in the revised Forest Plan, notably PCs 22000-1, 22000-3, 22000-4, and 32600-3. The response to PC 32600-3, in particular explains that age class objectives are applied only to suitable lands, mainly within the Oak-Hickory MA, that are managed using even-aged silvicultural systems, although the analysis in the DEIS, Section 3.5, specifically included an assessment of age class outside of lands managed using these techniques.

PC 32500-3: The Forest Service should increase analysis and emphasis on wildlife that require very mature forest stands or large dead/dying trees as opposed to focusing on common wildlife species/game species.

Response: Section 3.6 of the DEIS includes four indicators for analysis of potential effects of the revised Forest Plan on wildlife and wildlife habitat (DEIS p. 3-96). One of these indicators is acres of the Forest allocated to contiguous, mature forest habitat. Analysis relative to this indicator examines differences between alternatives in acreage and contiguity of forest stands, tree species, tree age, and options for management and how these factors may affect wildlife species associated with these lands (DEIS pp. 3-111-114). Although many species occur in mature and older forest habitats, the Forest Service is not aware of any that “require very mature forest stands” (Hagan 2004, Yamasaki 2004). Thus the Forest Service chose to analyze contiguous, mature forest habitat.

The Forest Service agrees that pileated woodpeckers, scarlet tanagers, and barred owls, species cited by the commenter, as well as the black-throated blue warbler, the species selected by the Forest Service as management indicator species (MIS) (DEIS p. 3-102), each require large tracts for contiguous forest habitat (Holmes 1994, Bull and Jackson, 1995, Mowbray 1999, Rosenberg et al.1999, Mazur and James 2000). Further, large dead and dying trees or snags are important for pileated woodpeckers and barred owls to use as nesting and roosting cavities. Such features are associated with late-succesional or old growth forest stands, although Bull and Jackson (1995) state that younger tree stands also provide suitable habitat for pileated woodpeckers, provided that some large dead and dying trees are also available. Mazur and James (2000) provide management considerations appropriate for barred owl, including lengthening of timber rotations, maintenance of natural forest age structures, and retention of vertical structure such as snags.

The Selected Alternative allocates 2,655 acres (16%) of the FLNF to MAs where changes in species composition, age distribution, and structure of the forest will take place primarily through natural ecological processes (see FEIS Table 3.10-6). Lands allocated to these MAs form a relatively contiguous forested area that will continue to age, moving slowly toward old growth conditions. FLNF lands allocated to MAs that allow timber harvest also will provide extensive suitable habitat for pileated woodpeckers and barred owls. Forest-wide standards and guidelines provide for wildlife reserve trees (revised Forest Plan pp. 25-26), emphasizing retention of all soft snags, trees and snags with cavities, large-diameter dead and dying trees, and other trees and snags that provide suitable nesting, roosting, and foraging habitat for pileated woodpeckers and other species of wildlife. The Forest Service will retain uncut patches of trees equal to five percent of the harvested area where even-aged harvest reduces the basal area of a stand below 30 square feet per acre. In areas where harvest will leave basal area above 30 square feet per acre, the Forest Service will reserve at least five wildlife trees per acre. Management direction for retained trees emphasizes cavity or snag trees of the largest available diameter at breast height (dbh), live trees with exfoliating bark, den trees, or nest trees. In areas lacking such cavity trees and snags, the Forest Service will retain at least two trees of the largest available dbh with defects likely to lead to cavity formation.

Objectives under Goal 2 in the revised Forest Plan include increasing acres of late-successional and old forest habitats through natural successional processes within lands not suitable for timber, and through use of extended rotations within lands suitable for timber (revised Forest Plan pp. 11-12). Lands emphasizing recreation, enhancement of ecological communities, wildlife habitat, or other resource values, may be managed to longer rotations, up to the Extended Rotation Ages (revised Forest Plan pp. 11-12).

Mature and older forest will be available even on lands proposed for management with even-aged silviculture. The Selected Alternative allocates 1,219 acres of northern hardwood- and oak-dominated forest to management with even-aged techniques. Over the short-term (10 to 20 years), 66 to72 percent of these lands will be covered by mature or older forest. In the long-term (150 years), 55 percent will be mature or older (FEIS Tables 3.5-19, -20, and -21). Considering the acreage that will mature to old forest conditions, the amount of mature and older forest available in those stands to be managed by even-aged techniques, and retention of large, old and dying trees with cavities and nests, the FLNF will continue to provide suitable habitat for wildlife species that require large tracts of mature contiguous forest and large trees and snags that provide nesting and roosting cavities.

Vegetation Management (32600)

PC 32600-1: The Forest Service should define the desired mix and location of forest types and age class distributions to insure maintenance and protection of existing old forest habitat.

Response: See response to PC 62000-1.

PC 32600-2: The Forest Service should reconsider the emphasis on promoting oak growth to avoid potential devastation from Sudden Oak Death disease.

Response: The commenter is concerned that the Oak-Hickory MA, by emphasizing oaks, will invite disastrous consequences when invaded by the microbe that causes Sudden Oak Death disease. The Forest Service shares the commenter's concern that Sudden Oak Death disease is a potential threat to Eastern forests, including the FLNF. The revised Forest Plan identifies as a standard the need to work cooperatively with other federal agencies and the State of New York in the monitoring and control of invasive and/or destructive species (revised Forest Plan p. 28). In addition, the revised Forest Plan (p. 28) addresses this issue in the Forest-wide standards and guidelines on the threat of non-native invasive species, insects, and disease pathogens. If the Sudden Oak Death disease is discovered on the FLNF, a strategy will be developed in cooperation with the NY Department of Environment and Conservation (DEC) to address the concern.

Maintaining species diversity is an important aspect to maintaining forest health. The Oak-Hickory Management Area (MA) emphasizes not just oak, but a variety of shade intolerant species, including hickory, white pine, and aspen, as well as patches of more shade tolerant species such as northern hardwoods. Generally speaking, a diversity of tree species and age classes, growing on sites ecologically suited to them, will be more resistant to disease than forests of all the same species and age or trees growing off-site. It is the desired condition of this MA to maintain a diversity of species and age classes, as indicated in the revised Forest Plan (p. 49). It is also an objective under Goal 2 of the revised Forest Plan to ensure that forest types are grown on sites that ecologically support them (p. 10). Attempting to de-emphasize oak, or to convert oak forest to northern hardwood, would eliminate species associated with these forest types, reduce biodiversity of the Forest, and may lead to increased incidence of poor health in northern hardwoods in areas that are more suitable for growing oaks, all prior to any documented occurrence of the disease on or adjacent to the FLNF. By working with partners in monitoring and prevention, and maintaining healthy, diverse forests, the revised Forest Plan is situated well to address this disease should it appear on the Forest.

PC 32600-3: The Forest Service should revise the tables and values in the Vegetation Environmental Consequences analysis for accuracy and reporting clarity.

Response: The commenter is concerned that the DEIS text associated with Table 3.5-5 in the Vegetation section (DEIS p. 3-45) misrepresents age class distribution on the Forest, and so would like clarification or correction. The commenter is correct that the text associated with this table does not accurately represent that the age class objectives are applied only to suitable lands, mainly within the Oak-Hickory Management Area, that are managed using even-aged silvicultural systems. This language has been clarified in the FEIS (see section 3.5.1.1).

The commenter had a related concern that if the table applied only to lands managed using even-aged silviculture, then the age class analysis really applies to a very small percentage of the Forest, and so over-projects the actual regenerating age class across the Forest while under-projecting the older age

classes on the Forest. The Forest Service acknowledges that the tables associated with the age class analysis in the DEIS (p. 3-45), which were based on modeling by SPECTRUM for suitable lands, only apply to lands managed using even-aged management. The analysis in the DEIS, Section 3.5, specifically included an assessment of age class outside of lands managed using these techniques. For every alternative under every vegetation type, the analysis refers to conditions outside of the Oak-Hickory Management Area, where either uneven-aged techniques or little vegetation management will occur. This analysis makes it clear that a substantial proportion of the forested lands outside of this management area will develop older forest characteristics, and that the Shrubland Management Area accounts for a substantial proportion of the acres of land likely to provide early successional habitat associated with regenerating hardwoods. In addition, almost 6,000 acres of grassland is allocated on the Forest which also provides early successional habitat. With the Grassland and Shrubland Management Areas combined, 45 percent of the Forest will be providing various forms of early successional habitat, in addition to regenerating forested stands (DEIS, Table 3.5-14).

PC 32600-4: The Forest Service should revise the Regenerating Age Class Objective for Mixed Hardwood/Mesic Forest to a range of eight to twelve percent.

Response: The commenter contends that a range of 8 to 12 percent for the regenerating age class objective for mixed hardwood forest is more appropriate than the 5 to 10 percent identified in the proposed Forest Plan (p. 11). Age class objectives in the revised Forest Plan are based on rotation age, because forested stands to which they apply are regulated by rotation age (see revised Forest Plan pp. 11-12). Forested stands under uneven-aged management are not regulated by rotation age. For a group of stands under regulation using a 100-year rotation schedule, only 10 percent of the stands can be harvested every decade; to harvest more every decade would be unsustainable because an ever-increasing proportion of the stands would be too young to harvest.

The FLNF has determined that a regenerating age class represented by one decade (0-9 years old) best meets the agency's objectives for regenerating early successional habitat. This age class provides habitat that closely approximates the regenerating size class described by DeGraaf et al. (1992). The trees on this Forest grow quickly, and by 10 years of age are transitioning out of the regeneration/seedling stage of development desired by species associated with this early successional habitat. Because the regenerating age class represents only one decade, the desired proportion for this age class should be 10 percent in the context of a 100-year rotation. The revised Forest Plan, however, includes the option to use extended rotations of 150 years or longer in these areas. Extended rotations would require a smaller proportion of stands to be harvested every decade, for example, 5 percent for a 200-year rotation schedule. Over time, it is likely that given these factors, the actual proportion of this age class within stands managed using even-aged silvicultural methods would be less than 10 percent. Consequently, the Forest Service identified the desired range for this objective at 5 to 10 percent. A range of 8 to 12 percent, which could provide for an average of 10 percent in the

regenerating age class, does not account for the use of extended rotations, and has the potential to become unsustainable if management strives toward the upper end of this range. Maintaining the maximum of the range at 10 percent ensures sustained yields, as required by the Multiple-Use Sustained-Yield Act of 1960.

PC 32600-5: The Forest Service should continue direction to maintain higher levels of aspen forest to aid in mitigation of early-successional forest habitat deficiencies.

Response: The commenter agrees with the DEIS proposal for higher levels of aspen forest, and with the composition and age class objectives outlined in the revised Forest Plan (p. 11). The Forest Service appreciates the commenter's support, and hopes, as does the commenter, that these objectives will help stop declines in species associated with early successional habitats.

PC 32600-6: The Forest Service should define how existing patches of old forest will be managed when they occur in the Oak Hickory MA.

Response: See response to PC 62000-1.

PC 32600-7: The Forest Service should clarify in the Vegetation Affected Environment discussion that the term "young forest" includes regeneration components of forest communities.

Response: The language in the Vegetation Affected Environment discussion (section 3.5.1.1) referring to "young forest" is meant to include or indicate regenerating forest. The wording has been changed in the FEIS to reflect this intent.

PC 32600-8: The Forest Service should establish repercussive measures for Forest partners who mow grasslands when bird populations are nesting.

Response: The Forest Service routinely coordinates with the US Fish and Wildlife Service, the New York State Department of Conservation, and other partners to determine the appropriate maintenance schedule and application times for grassland management (revised Forest Plan p. 25). The Forest Service retains flexibility for developing site-specific management for individual grasslands, which may include mowing or burning at an earlier date than is optimal for grassland birds (see response to PC 22000-14). The Forest Service accomplishes grassland and pasture maintenance primarily through contractors. The Forest Service provides contractors with appropriate information from standards, guidelines, and other management direction to insure that maintenance is accomplished properly to achieve site-specific goals. In the event that a contractor's actions are contrary to management direction, the Forest Service will evaluate the circumstances and magnitude of the infraction, and whether non-compliance resulted from misunderstanding or intentional violation of contract terms. The actual terms of repercussive action would be dictated by all these factors. The Forest Service emphasizes communication with partners and contractors to prevent, or if necessary to correct, such problems. If necessary in extreme cases, the Forest Service can terminate contracts or agreements or take legal action.

PC 32600-9: The Forest Service should take a proactive stance to protect at-risk plants, including coordinating with groups such as United Plant Savers.

Response: Plants that may be at risk on National Forest System lands, and are documented to occur there, are rated on their abundance, distribution, population trend, habitat integrity, and population vulnerability. If they are determined to be at risk on the FLNF, they are then listed as Sensitive for the FLNF on the Regional Forester Sensitive Species (RFSS) list (DEIS p. 3-129). A number of interest groups, including the New York Natural Heritage Program and local contract botanists, help the Forest Service to evaluate species for inclusion on this list. In addition to direction in the Forest Service Manual, the revised Forest Plan states goals and objectives (p. 12) and standards and guidelines (pp. 26-27) related to the protection of plants on the RFSS list and other species of concern. Revised Forest Plan Goal 15 and its objectives encourage the Forest Service's involvement with partnerships, communities, and other agencies (p. 16).

Fire and Fuels Management (33000)

PC 33000-1: The Forest Service should continue management direction that encourages utilization of prescribed fire management to create, restore, and enhance successional habitats and ecological processes.

Response: The commenter expressed support for management direction on fire included in the proposed Forest Plan. The revised Forest Plan maintains that language under Goal 5 (p. 13) and Fire Management Standards and Guidelines (p. 29).

Timber Resource Management (34000)

PC 34000-1: The Forest Service should implement a management approach that focuses on trying to maximize tree-to-forest stand values in lieu of harvesting trees before they reach their potential size, board foot volume, and economic, ecologic, and aesthetic value.

Response: The Forest Service is committed to achieving the revised Forest Plan desired goals and objectives in an environmentally acceptable manner, including using an ecological approach to determine harvest volumes (DEIS p. 3-219-220). The desired ecological conditions for each alternative was determined and the Forest Vegetative Simulator growth and yield model (Northeast TWIGS variant) was used to identify the resulting timber volumes (DEIS Appendix B). The Forest Service operates under the multiple-use mission, which dictates that the forest be managed for much broader purposes than its commodity values. The revised Forest Plan is outcome based rather than output based, meaning that the desired future conditions, objectives, and goals are centered on the Forest's condition after management actions take place. Outcomes will be based on such things as short and long-term species composition, age-class distribution, spatial arrangements and patterns, variety

of habitat types and conditions, variety of recreation settings, general vigor and health of the forest, and ecosystems and sustainability of ecosystems over time to provide a variety of uses, values, products and services for present and future generations. These outcomes are not necessarily at odds with improved timber growth and yield, but represent a broader purpose than the commodity values alone (DEIS p. 3-213).

PC 34000-2: The Forest Service should develop and scope two to three times the number of vegetation management proposals as what may be "required" to meet proposed objectives in order to offset delays caused by litigation, environmental conditions, or unplanned ecological reviews.

Response: The revised Forest Plan provides a framework and context that guides the FLNF day-to-day resource management operations. It is a strategic, programmatic document and does not make project-level decisions (revised Forest Plan p. 4). The ability to implement vegetation management activities to achieve revised Forest Plan objectives will be primarily dependent on budget allocations. Annual Forest budget proposals are based on the activities and actions required to achieve the desired conditions and objectives of the revised Forest Plan. Congress reviews and allocates Forest budgets on an annual basis which may or may not be sufficient to implement proposed annual activities. The final determining factor in carrying out the intent of the revised Forest Plan is the level of funding, which dictates the rate of implementation (revised Forest Plan p. 6).

PC 34000-3: The Forest Service should adopt a hands-off vegetation management approach to allow old growth to develop and natural evolution to occur in lieu of managing the Forest based on computer models and historical 1790 conditions.

Response: Protection, preservation, and restoration of ecosystems and forest health are some of the many emphases for which the Finger Lakes National Forest is being managed under the revised Forest Plan. The Forest Service mission is "to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations." The Multiple-Use Sustained-Yield Act of 1960 states: "It is the policy of the Congress that the National Forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes." In order to meet the mission as well as multiple-use, some areas are identified for protection and preservation. Other areas are identified for active management for purposes such as ecosystem restoration, production of goods, and maintaining or improving productivity and forest health.

The Forest Service believes that the revised Forest Plan provides a balance between protection and preservation of ecosystems where natural processes dominate, and management for biological diversity, restoration, and extractive uses like timber harvest. The revised Forest Plan has greatly increased allocations to management areas specifically designed for protection, preservation, and restoration through natural processes, including Ecological Special Areas, Future Old Forest, Existing and Candidate Research Natural Areas, as well as lands unsuitable for timber management (see Table 3.10-6 of FEIS). These are the areas in which old growth characteristics will develop

over time. In addition, vegetation management will be limited in the North Country National Scenic Trail Special Area, and in the Recreation and Education Special Areas (revised Forest Plan pp. 55, 57-58). Together, these areas represent about 18 percent of the Forest, and 34 percent of the forested landbase.

The Forest Service uses ecological models and pre-European settlement survey records to help identify the composition, age class structure, and natural disturbance regimes of forest communities at some point in the past. This is desirable to help understand whether ecosystems have become degraded, damaged, or destroyed and may benefit from restoration. When ecosystems experience disturbances and fluctuations similar to those experienced historically, they tend to become resilient over time in responding to these changes. Species evolve adaptations that allow them to bounce back from such disturbances. When disturbance patterns suddenly change, dramatic changes in species composition and ecosystem structure can occur. If dramatic enough, such disturbances can cause ecosystems to simplify or collapse, accompanied by a loss of biological diversity. Often such degraded ecosystems become more susceptible to non-native insect and disease infestations. Ecosystems that have experienced dramatic changes in disturbance patterns are those that benefit from restoration (DEIS pp. 3-41 to 3-43). As described in the Vegetation section 3.5.1.1 of the FEIS, ecosystems in the Finger Lakes regions and on the Forest have experienced dramatic changes in disturbance patterns during the period of colonization and agriculture, and would benefit from restoration. More details regarding the basis for evaluating ecosystems in the context of historical disturbance patterns can be found in section 3.1.4 of the FEIS.

PC 34000-4: The Forest Service should manage stands based on soil conditions, past management treatments, ecological tendency, and current condition.

Response: The Forest Service agrees that stands should be managed based on soil conditions, management treatments, ecological tendency, and current conditions. The vegetation management strategy of the revised Forest Plan is built upon maintaining biological diversity (DEIS p. 3-45). See response to PC 11000-2.

PC 34000-5: The Forest Service should fully implement the timber and vegetation management components of the Preferred Alternative in order to provide adequate early-successional habitat and to mitigate habitat deficits accrued during implementation of the 1987 Land and Resource Management Plan.

Response: The Selected Alternative provides for early successional habitat at suitable levels that benefit wildlife species that favor these conditions (FEIS section 3.6.2). Meeting revised Forest Plan habitat objectives assumes full implementation of vegetation management activities. The major inhibiting factor in meeting these objectives is budget constraints (revised Forest Plan p. 6).

PC 34000-6: The Forest Service should prioritize maintenance and diversification of red pine plantations.

Response: An objective was added under Goal 5 of the revised Forest Plan to convert planted softwood stands to native vegetation that is suited to the site (revised Forest Plan p. 13).

PC 34000-7: The Forest Service should re-model and re-evaluate data presented in the Timber Management Environmental Consequences analysis for accuracy and reporting clarity.

Response: The commenter has concerns that regeneration harvesting presented in DEIS Table 3.5-23 is inconsistent with similar information in Table 3.11-5, and that current regeneration acres are not sufficient to support projected shelterwood removal harvesting. First, Table 3.5-23 and 3.11-5 do not represent the same projections. As noted in the title of Table 3.11-5, this table represents annual harvest acres over the first 10 years of revised Plan implementation. As noted in the title of Table 3.5-23, this table represents annual harvest acres over the entire 150-year modeling period. Given that age classes on the Forest are currently heavily weighted toward the mature age class, and will not be balanced until the modeled harvesting has been implemented for a full rotation (100 years), it is reasonable to expect that average annual acres in the first 10 years will vary from projections averaged over a 150-year period.

The commenter indicated that regeneration acres projected in Table 3.5-23 were more than twice those projected in Table 3.11-5. The footnote associated with the "Total Average Annual Regeneration" row in Table 3.5-23, however, indicates that all regeneration harvesting is included except for thinning, which is an intermediate treatment, not a regeneration method. Uneven-aged methods are considered regeneration or reproduction methods (Smith 1986, p. 330), as indicated in Table 3.5-23. When the commenter evaluated the annual harvest acres in Table 3.11-5, however, they did not include uneven-aged harvests. As indicated in Table 3.5-23, uneven-aged harvests comprise about half of the annual regeneration harvests projected. Excluding these harvests, annual regeneration harvests over 150 years would account for an average of about 28 acres annually, while Table 3.11-5 estimates annual regeneration harvests over the first 10 years at about 22 acres. These numbers are fairly close, considering they represent annual harvesting over very different time frames.

The commenter also indicated that existing regenerating forest, as indicated in Tables 3.5-9, -10, and -11, within the lands identified by SPECTRUM for even-aged management, would not be sufficient to support yearly shelterwood removal cuts of six acres per year, as suggested in Table 3.11-5. The projections shown in Table 3.11-5 are <u>average</u> annual harvest acres, however, based on the total acres per decade estimated by SPECTRUM. SPECTRUM projects acres harvested for each decade, not each year. SPECTRUM reports 60 acres of forest in which to do shelterwood removal harvests in the first decade. These acres are not derived in SPECTRUM from the acres available in the regenerating age class (Table 3.5-10, 11), as assumed by the commenter. In the first decade before stands have a history that SPECTRUM

can track, SPECTRUM assigns prescriptions to each stand, and then identifies stands for harvesting based on overstory ages. The model assumes that stands that are in the regenerating age class have already had a regeneration harvest, and so these stands are not targeted for treatment. For stands with shelterwood prescriptions, SPECTRUM tracks the overstory age of these stands until the overstory is removed (A. Reger, personal communication, 2006). Consequently, a stand with a shelterwood prescription would become a regenerating stand only after the removal of the overstory, not after the initial seed cut.

In order to constrain the amount of acres selected by the model for removal cuts, the model was limited to the amount of stands available for overstory removal based on the silviculturist's on-the-ground knowledge and historical averages (B. Burt email communication, 2004). A review of inventory and accomplishment data indicate that there are enough acres of forest that are awaiting removal cuts within the Oak Hickory MA to support these estimates (D. Burbank, email communication, 2006). In addition, not all shelterwood regeneration cuts get an overstory removal within desired timeframes, usually within the first decade. Shelterwood removal cuts can still be successfully implemented in stands that are 10 years old or older, up to perhaps 25 years old. Consequently, there will be shelterwood stands that are not showing up in the timber model data as regenerating age class that are still appropriate for shelterwood removal harvesting, and this is supported by agency data that was not incorporated into the modeling.

It is also important to remember that the SPECTRUM model was used as a tool to help develop programmatic timber harvest schedules for each alternative. It was not intended to be used to develop a site-specific harvest plan for future timber sales. Site-specific environmental analysis would be required to identify the actual acres treated annually and may determine that the removal harvest be delayed for several years based on other resource objectives, or that additional opportunities exist for removal harvest. The model results are best used as a means of comparing alternatives, rather than predicting actual acres of particular harvest types. By applying a consistent modeling approach and varying the inputs consistent with the design of each alternative, decision makers can see the impacts expressed in a broad range of outputs across alternatives.

PC 34000-8: The Forest Service should prohibit commercial timber harvests.

Response: An alternative with no timber harvesting was considered but eliminated from detailed study, and was discussed in section 2.1.5 of the DEIS (p. 2-8). The Multiple-Use Sustained-Yield Act of 1960 states that, “It is the policy of the Congress that the National Forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes.” This means that the National Forests will be managed to provide for the use of all the various renewable surface resources in a combination that best meets the needs of the American people. The Selected

Alternative and revised Forest Plan provide a balance between competing concerns while managing for biological diversity, off-road vehicles, timber harvest, and non-motorized recreation. Harvesting is done on the FLNF to accomplish a variety of objectives, including habitat management, fuels reduction, and enhancement of forest health, as well as commodity production (DEIS pp. 3-214 and 3-216).

PC 34000-9: The Forest Service should consider a more conservative annual allowable sale quantity to favor long-term forest health over volume production.

Response: Alternative 2 was developed to address a public desire for larger undisturbed areas with less human intervention (DEIS p. 2-6). This alternative provides for an allowable sale quantity of 94 thousand board feet (mbf) compared to 245 mbf in the Selected Alternative (FEIS section 3.11.2). The EIS analyzed three alternatives with different outcomes and with varying management area allocations, addressing Forest Plan revision issues. Each alternative meets the intent of relevant laws, including the Multiple-Use Sustained-Yield Act of 1960, under which the national forests are managed. The Regional Forester considered all of the alternatives, and the Record of Decision (ROD) describes his rationale for the Selected Alternative. The Selected Alternative represents what Forest managers believe to be the best balance of outcomes in achieving sustainable ecosystems and meeting the intent of relevant laws, as well as addressing the issues and concerns specific to the FLNF.

Domestic Livestock Management (35000)

PC 35000-1: The Forest Service should establish livestock grazing measures that would restrict livestock from soft bottomed wetlands, wetland resources, and waters of the U.S. or that would fence wetlands occurring close to streams and livestock watering areas.

Response: Grazing of livestock on the FLNF is subject to Forest-wide standards and guidelines (S&Gs; see revised Forest Plan pp. 17-20 and 24-25). When fully implemented these S&Gs will exclude livestock from grazing in and near wetlands, ponds, and streams. S&Gs excluding livestock from these areas will not be fully implemented when the revised Forest Plan takes effect because it will take many years to fence out (or in other ways exclude livestock from) all streams, ponds, and wetlands from grazing areas.

The Forest Service began fencing these areas in the mid-1990s because of concerns about the effects of grazing on water quality and the health of riparian areas. The Forest Service continues to have these concerns, but it will take resources (such as time and funding) to fence all waters. The following objective has been added to Goal 4 in the revised Forest Plan (p. 13): “Take needed measures to control cattle access on all water resources (including stock ponds, streams, wetlands, seasonal pools, and riparian areas) within the next ten to fifteen years.”

Once revised Forest Plan S&Gs are fully implemented in grazing allotments, Forest Service management will meet or exceed State of New York Best Management Practices (BMPs) for grazing areas. Specifically, these BMPs consist of standards for Filter Strips (Code NY393s), Riparian Forest Buffers (Code NY391), and Ponds (Code NY 378).

Mining and Mineral Exploration (36000)

PC 36000-1: The Forest Service should prohibit oil and gas development.

Response: Following the release of the DEIS, the Energy Policy Act of 2005 withdrew the FLNF from oil and gas leasing availability. The FEIS has been modified to reflect that oil and gas development is currently prohibited under all alternatives (see section 3.18)

Recreation Management, General (50000)

Dispersed Recreation Management (53000)

PC 53000-1: The Forest Service should continue to provide special management direction for the North Country Trail, including managing the trail for foot travel only and prohibiting future trail crossings.

Response: The revised Forest Plan provides specific direction for the North Country National Scenic Trail through Special Management Area direction (pp. 54-56). The North Country Trail will continue to be managed for foot and other pedestrian means such as skis or snowshoes. Horses, pack animals, bicycles, and motorized vehicles on the North Country Trail are prohibited. New trail crossings on the North Country Trail should be prohibited, exceptions will only be granted when the rationale can be adequately disclosed in a site-specific environmental analysis, including opportunities for public involvement (revised Forest Plan p. 56).

PC 53000-2: The Forest Service should manage the Interloken trail for foot travel only and prohibit bicycles, horses, and motorized vehicles.

Response: The revised Forest Plan is a strategic, programmatic document and does not make site-specific decisions. Guidelines in the revised Forest Plan (pp. 30-31) describe management intent for the Forest Trail system. The Interloken Trail will continue to be managed primarily for foot travel, however shared use may be allowed with other non-motorized uses such as bicycles and horses to facilitate loop opportunities. Bicycle and horse use are currently allowed on the northern segment of the Interloken Trail. The new guideline represents continuation of existing management practices.

In general, management intent for the Interloken Trail is to retain flexibility for considering exceptions to foot travel only, including development of loop trails and shared-use, or temporary trail locations due to management activities. A decision to open or close a specific trail to new types of use would require site-specific environmental analysis with public involvement.

Lands and Special Designations (60000)

Land Designations/Management (62000)

PC 62000-1: The Forest Service should designate more of the Future Old Forest (FOF) Management Area (MA) or MAs that utilize extended rotations to allow a higher percentage of the Forest to grow old.

Response: Several commenters expressed concern over areas of older forest that were not allocated in the proposed revised Forest Plan to Future Old Forest or similar types of management area (MA) designations, such as Research Natural Areas or Ecological Special Areas. They identified six areas of concern with their comments, which will be addressed here. These areas of concern included: (1) an interest in seeing all older forest areas placed in protective MAs; (2) wanting to see more older forest areas added to the Future Old Forest MA, including certain areas of the Forest; (3) a desire to see Future Old Forest include more older stands and fewer young stands, plantations, and open lands; (4) a desire to see Future Old Forest areas as more contiguous, with corridors connecting the patches, and elimination of the more isolated pieces; (5) restrictions on harvesting in patches of older forest that are in the Oak Hickory and Northern Hardwood MAs; and (6) a desire to inventory for and assess occurrences of older patches of forest for significance, and protection of these patches. Although specific alternatives that suggest allocation changes for the Future Old Forest MA have been considered, they have not been included for detailed analysis in the FEIS (see FEIS Section 2.1.6).

When the Forest Service developed the allocation of lands to the Future Old Forest (FOF) MA in the alternatives, the age or condition of the stands included was not considered, other than that they were predominantly forested. The Forest Service was focused on setting up large blocks of unfragmented forest, where interior forest conditions could develop through natural processes over time, allowing some degree of solitude and remoteness in a very roaded and well-traveled landscape. Given that the Forest had either been harvested repeatedly during settlement, or was reverting to forest after having been converted to farmland, Forest Service staff believed that stand condition was less important than the landscape or geographic considerations used in allocating land to this MA. The Forest Service did, however, try to avoid including plantations and grassland within the FOF MA. An analysis of the composition and age class distribution of FOF and similar MAs for the preferred alternative in the proposed revised Forest Plan indicates that 11 percent of these areas include plantations and open land, two percent include stands less than 20 years old, and 49 percent include stands 70 years or older (Burbank 2006). The Forest Service believes that it is reasonable to expect that in attempting to create an FOF allocation that includes large blocks of land with low levels of fragmentation on a forest with the land use history of the FLNF, such areas will include stands of less desirable composition and age in some places, although this should be minimized to the extent practicable.

The commenters have contributed to the rethinking of this approach. It makes sense to place as many of the identified older stands as possible in the FOF MA or the ecological reference area network (FOF, Research Natural Area and Ecological Special Area MAs) as this is where old forest conditions will recover

most quickly (see also section 3.10 of the FEIS for further discussion of the RAN). The allocation strategy of building the FOF MA around older stands would also need to be balanced against the need to maintain the original goals for the FOF MA of large contiguous blocks of land with low levels of fragmentation and isolation. An analysis of the distribution of stands 80 years and older indicates few areas of concentrated groupings of stands, with a fairly wide distribution of these stands across the Forest, generally in small patches (Burbank 2006). Consequently, the Forest Service decided to focus changes to the allocation of lands to the FOF MA on connecting existing areas within the RAN, concentrating on the older stands, rather than placing small patches of older forest in the FOF MA and leaving them scattered across the Forest or connected through a fragmented web.

This allocation approach, however, needs to be balanced with management for timber products and vegetation structure. Goal 8 of the revised Forest Plan states that the Forest Service will provide for a sustainable supply of forest products, including high quality sawtimber (p. 14). Most stands that are currently 80 years or older and fall within the Oak Hickory and Northern Hardwood MAs will reach rotation age within the planning cycle of the revised Forest Plan (for further discussion of rotation ages and why trees are often harvested when they reach 100 years old, see response to PC 22000-19). These are stands with high densities of sawtimber. If all of these stands are placed within the FOF MA, then forest products will be reduced to those provided through thinning of young stands, which will include lower amounts of sawtimber than is desirable. In addition, some of these stands provide high opportunities to maintain and enhance oak and oak-pine natural communities (see Goal 5 objectives, revised Forest Plan p. 13). Oak and oak-pine natural communities are likely to succeed to mesic hardwood forests without silvicultural and/or fire treatments (see also FEIS, Vegetation section 3.5.1).

Goal 2 of the revised Forest Plan includes age class objectives for the regenerating age class (p. 11). This age class is identified as important for wildlife habitat. Again, if all stands 80 years or older were placed within the FOF MA, there will be no regeneration harvesting on the Forest and age class objectives for the regenerating age class will not be met. Consequently, the Forest Service decided not to place all of the stands that are 80 years or older within the FOF MA or the RAN.

Two commenters provided suggestions on areas to include in or exclude from the FOF MA. Areas suggested for addition are focused in the region south of Mathews Road; areas suggested for removal include two isolated parcels on the east and west sides of the Forest, and the northernmost parcel of the FOF MA in draft Alternative 3 (see DEIS Chapter 2 Alternative 3 maps). These areas were analyzed in terms of size, proportion of older stands, composition, and age class distribution for comparison to draft Alternative 3 (Burbank 2006). This analysis indicated several things. First, there are several stands of older forest south of Mathews Road that would provide a means to connect the Research Natural Area (RNA) at the south end of the Forest with the Ecological Special Area by Blueberry Patch, and the FOF MA area north of Picnic Area Road. Large portions of the area south of Mathews Road, however, are dominated by plantations. If the Forest Service used the proposal presented by one commenter who suggested placing all the lands south of Mathews Road

into one large FOF area and eliminating the northernmost area, such an allocation would result in 31 percent of the RAN in plantations and early successional land and 62 percent of the RAN younger than 70 years (Burbank 2006). While this proposal increases the proportion of stands 80 years or older in the RAN to 37 percent, Forest Service staff felt that the tradeoff with less desirable stands was unacceptable. Even in the other commenter's proposal which proposed less land south of Mathews Road in the FOF area and kept the northern FOF patch, the acres of plantations included would triple. The Forest Service decided to focus allocations of additional lands to the FOF MA in areas of older forest and away from plantations, seeking a continuous connection from the RNA to Mathews Road.

The following table from Burbank (2006) compares the draft alternative, two proposals by commenters, and the Selected Alternative:

Table 13 – Comparison of proposals for RAN in terms of various items of interest.

Comparison Item	Alt 3 Draft	Comm 1	Comm 2	Alt 3 Final
Size of reference area network (acres)	2,193	3,657	3,346	2,473
Proportion of 80 year and older stands included (%)	30	37	45	35
Plantations & early successional habitat (acres)	250	1,115	491	304
Proportion of area younger than 70 years (%)	51	62	52	48

The Forest Service does not agree with elimination of the northernmost patch of FOF. It contains the largest concentration of older forest on the Forest, and it provides for much needed interior forest habitat in an area of the Forest that is dominated by open lands. Rather than eliminate it, Forest Service staff found several additional areas of older forest south of the draft Alternative 3 boundary of this FOF area where a connection could be made between this area and the next area of FOF to the south. In addition, the northernmost patch of FOF MA is the only one to represent the Ecological Landtypes (ELTs) that dominate the northern portions of the Forest. Without this area in FOF, the Forest Service will not be able to meet the objective under revised Forest Plan Goal 5 (p. 13) to manage at least five percent of each ecological type for old growth characteristics. This area was not eliminated from the FOF MA, but its size was reduced so that it is not divided by Potomac Road to the east, or the No-tan-takto Trail to the west. These two travelways form the eastern and western boundaries of this FOF area in the Selected Alternative. The area to the east of Potomac Road was placed in the Northern Hardwood MA, while the area west of No-tan-takto Trail was placed in the Oak Hickory MA, based on ELT mapping (DeGloria 1998).

The Forest Service agrees with the suggestion to eliminate the two isolated patches of FOF MA along the east and west sides of the Forest. They do not meet the desired future condition of large blocks of land for this MA (see revised Forest Plan p. 51). The desire originally was to use these parcels as a

focus to build FOF blocks near the edges of the Forest through acquisition. It will be difficult, however, to manage for Future Old Forest conditions in such small and isolated blocks. Consequently, these parcels were removed from Future Old Forest MA and allocated the eastern one to Northern Hardwood MA, and the western one to Oak Hickory MA, based on ELT mapping (DeGloria 1998).

The resulting changes in the allocation of lands to the FOF MA have been incorporated into the Selected Alternative and are presented in FEIS section 3.10.2. The analysis of this alternative indicates that 35 percent of the stands 80 years and older are included in the RAN, that 12 percent of the RAN includes plantations and early successional lands, and that 48 percent of the RAN is younger than 70 years (Burbank 2006). These changes improve the quality of the FOF MA allocation and RAN as a whole, in spite of the slight increase in the proportion of plantations due to inclusion of areas south of Mathews Road.

Commenters were also concerned about how older forest patches will be managed when they fall within the timber management MAs, Northern Hardwood and Oak Hickory. Because none of these stands are currently old growth or approaching old growth and most if not all had been cleared prior to federal ownership, they do not have a level of ecological importance sufficient to qualify them for designation as Ecological Special Areas or RNAs. The highest quality examples were placed into Old Growth Areas during the 1987 Plan, and those allocations have simply become part of the RAN in the Selected Alternative. Although these areas of older forest may have been continuously forested since the early 1900s, that does not make them unique. More than 90 percent of the Forest is within 40 years of reaching the 80 year old mark, and around 70 percent of the Forest is within 20 years of this age. Simply because a forest ages does not mean it becomes ecologically significant and deserving of protection. If this were the case, logic would suggest that once every stand reached 80 years it would be reserved, and in 80 years all the forested land on the FLNF would be reserved. This makes little sense in the context of the ability of forests to regenerate, or the context of the multiple-use mission of the Forest Service. As the Forest continues to recover from its land use history, forests will continue to age within the RAN and in areas where extended rotations are used. Old trees will also occur in areas of uneven-aged management, although they will be mixed with a range of trees of various sizes. As noted previously, older stands that fall within the timber management MAs are within 20 years of rotation, and without the ability to regenerate these stands, the objectives associated with revised Forest Plan Goals 2 (pp. 11-12) and 8 (p. 14) will not be met. Consequently, there the Forest Service has not provided any additional protections for older stands other than to allocate more of them to the FOF MA. The rotation age language associated with age class objectives under Goal 2 has been clarified to make it clear that extended rotations can be used in areas of timber management for various reasons (revised Forest Plan pp. 11-12). (See also responses to PCs 11000-2, 22000-1, and 22000-19.)

In addition, ecological inventories will continue, and the Forest Service hopes to work with some of the commenters and others on evaluating some of these older stands to identify any characteristics of ecological significance. The

revised Forest Plan includes a standard under Rare and Unique Biological Features for rare and exemplary natural communities, which restricts management activities that may influence them to those that maintain or improve the communities (revised Forest Plan p. 26). Areas identified during revised Forest Plan implementation as rare, exemplary, or of ecological significance will be protected until they can be evaluated for designation as Ecological Special Areas, RNAs, or as part of the FOF MA.

PC 62000-2: The Forest Service should designate MAs to match existing ecological conditions and ecological tendencies, including designation of Research Natural Area or FOF MAs where old forest exists to prevent harvesting old stands.

Response: Designation of old forest as Future Old Forest MA is discussed in response to PC 62000-1; management allocation matching existing ecological tendencies and conditions is discussed in response to PC 11000-2.

PC 62000-3: The Forest Service should re-designate MAs to facilitate tourism and interpretation of landscape history or cultural and ecological landscapes.

Response: The revised Forest Plan, in the Role of the Forest, states that "The Forest has a long history of demonstration and education use and will continue to provide these benefits in the future" (p. 9). Goal 12 of the revised Forest Plan (p.15) is to "Provide a diverse range of information and education opportunities that will enhance the understanding of the FLNF." The Forest Service believes that special management area designation in areas identified by the commenter is not necessary because the revised Forest Plan allows for tourism and interpretation activities to be implemented through revised Forest Plan Goal 10 (p. 14) and Forest-wide standards and guidelines for interpretation and education (revised Forest Plan section 2.3.17).

PC 62000-4: The Forest Service should protect all perched white oak swamps by prohibiting timber harvesting in identified swamps and by designating them as Regional Forester Sensitive Species or as Ecological Special Areas.

Response: Page 3-53 of the DEIS indicates that there is only one known occurrence of the perched swamp white oak swamp natural community, which is rare in NY. This area is known as the Blueberry Patch Swamp. As indicated in Table 3.10-8, this area is designated as an Ecological Special Area (DEIS p. 3-207).

Section 3.8.1.10 of the FEIS indicates that there are three records for populations of the tree, swamp white oak. One population record is in the rare perched swamp white oak swamp natural community. The remaining records are not associated with this natural community. One record is along the edge of a stand and not associated with a wetland. The other record is from a wetland area that does not have the characteristics of a perched swamp white oak swamp (Deller 2000) – the swamp white oak was not the dominant tree species, there were no records of highbush blueberry or other ericaceous shrubs, and none of the characteristic herbs or ferns was present except for a manna grass species. This wetland appears, however, to have existed during

the 1790 military lot surveys, and so may simply be extensively degraded. Most of the wetland is on adjacent private land, and is disturbed by beaver, honeysuckle, and multiflora rose. Consequently, it is low quality and not suitable for establishment as an Ecological Special Area.

Swamp white oak is being evaluated for designation as an RFSS. The RFSS designations will occur after the revised Forest Plan is adopted, and is not part of the Plan revision decision. The decision to designate swamp white oak as an RFSS or not will be made based on the analysis in the FEIS, the broader species viability evaluation prepared for the FEIS, and any new information.

PC 62000-5: The DEIS should discuss the effects of Forest Service management activities on lands surrounding, upstream or connected to, wetlands, riparian areas, and other important ecological areas.

Response: The DEIS disclosed the effects of common Forest Service activities on the soil and water resources, which include wetlands, streams, and other riparian areas. Table 3.2-1 in the DEIS (p. 3-24) listed the major categories of activities that take place on the FLNF, and their corresponding potential effects on the soil and water resources. The effects analyses for soil and water (DEIS sections 3.2 and 3.3) were based on the effects of these activities, considering that Forest Plan standards and guidelines and additional mitigation measures would be implemented on individual projects. The effects of implementing specific projects adjacent or connected to wetlands, riparian areas, and other important ecological areas would be discussed in site-specific environmental analyses.

Areas of ecological significance known to the Forest Service are protected under the revised Forest Plan through allocation to protective management areas (Future Old Forest, Ecological Special Areas, candidate Research Natural Areas; see revised Forest Plan Chapter 3), and through a standard and guideline associated with Rare and Unique Biological Features (revised Forest Plan p. 26). The standard constrains management activities that may influence rare or uncommon natural communities to those that maintain or improve the natural communities associated with the area; the guideline constrains management adjacent to established Ecological Special Areas to those activities that do not compromise the ecological values of the area. Future Old Forest and candidate Research Natural Areas MAs were designated to be large areas to be adequately buffered from adjacent management. Revised Forest Plan direction protects the ecological values of these areas; analysis of the effects of activities on these areas will take place at the site-specific level.

PC 62000-6: The Forest Service should designate old forest patches with unique cultural or ecological values as Ecological Special Areas.

Response: Areas identified as including ecologically significant features were evaluated in 2004, and 11 sites were recommended for placement within the ecological reference area network, including Ecological Special Areas, Research Natural Areas, and Future Old Forest (see also FEIS section 3.10 and Table 3.10-3). The commenter suggests that the Forest Service develop a process to inventory and assess patches of older forest, and designate those with ecological significance or value as Ecological Special Areas. The

Monitoring Plan in revised Forest Plan Chapter 4 encourages monitoring with partners, and there is nothing to preclude such an assessment from happening under the revised Forest Plan. The monitoring identified in Table 4.1-7 of the revised Forest Plan associated with viable populations is directly related to this concern, as there is a management indicator species that will be monitored in association with older contiguous forest habitat. When new information becomes available that indicates a need to change management allocation or direction, the Forest Plan can be amended to make those changes, including the designation of areas of ecological significance as Ecological Special Areas. See also response to PC 62000-1.

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Comment from Agencies

Comments received from federal and local agencies are represented in the public concern statements. This section presents the comments from these agencies in their entirety (FSH 1909.15.24.1.3).

Name	Organization
Federal	
Andrew L. Raddant	United States Department of the Interior
John Filippelli	United States Environmental Protection Agency
County	
Kate Bartholomew	Schuyler County Environmental Management Council

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
408 Atlantic Avenue – Room 142
Boston, Massachusetts 02210-3334

August 2, 2005

ER-05/425

Forest Planner
NOI-FL Forest Plan Revision
Green Mountain and Finger Lakes National Forest
231 North Main Street
Rutland, VT 05701

Dear Forest Planner:

Thank you for the opportunity to review the Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan Revision Implementation (Proposed Plan) for the Finger Lakes National Forest, Seneca and Schuyler Counties, New York. The Department of the Interior has no comment on the DEIS or the Proposed Plan.

Please contact me at (617) 223-8565 if I can be of additional assistance.

Sincerely,

Andrew L. Raddant /s/
Regional Environmental Officer

FL-584

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

AUG 15 2005

REC'D AUG 19 2005

Paul K. Brewster
Forest Supervisor
Green Mountain and Finger Lakes
National Forests
US Forest Service
231 N. Main St.
Rutland, VT 05701

Dear Mr. Brewster:

The U.S. Environmental Protection Agency (EPA) has reviewed the Finger Lakes National Forest, draft environmental impact statement (draft EIS) (CEQ #050186), pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act.

At only 16,000 acres, the Finger Lakes National Forest (FLNF) is one of the largest and continuous public areas in the region. EPA recognizes the challenges confronting the FLNF caused by increasing development, insect damage and invasive species, fire hazard, and, at times, conflicting forest use demands. We commend the new planning format that integrates an over-arching vision, design criteria and legal framework, and forest-specific strategies linked to national goals. Of special note are the forest-specific goals and objectives and their characterization of desired conditions.

Three alternatives are evaluated in the draft EIS: Alternative 1 is the current management direction; Alternative 2 offers less human intrusion and focuses on future old growth forest management; Alternative 3 focuses on more recreation opportunities and on hardwood management for both wildlife and timber harvesting. The preferred alternative for the FLNF is Alternative 3.

Alternative 3 dedicates acres to the different management areas in amounts that fall somewhere between the two other alternatives. This alternative focuses on maintaining biological diversity and ecological integrity while providing an increase in recreation opportunities through reconstruction of trail facilities and construction of new facilities to accommodate increasing demand. It also proposes to maintain grazing on 32% of the forest lands, and nearly 40% of the forest would be available to timber harvesting. The draft EIS proposes to offer 80 acres annually for timber harvesting in the Northern Hardwood or Oak Hickory management areas. However, only 7% of the forest is proposed to be Future Old Growth and 3% is identified as Ecological Special Areas. EPA would wholly support the implementation of Alternative 3, given that certain modifications directed toward further ecological resource protection be made.

The Forest Plan contains particular goals that refer to ecological resource protection. For example, Goal Four discusses maintaining or restoring riparian, vernal pools and wetland habitats and Goal Six discusses protecting rare or outstanding ecological areas. The draft EIS

states that 277 acres, or less than 2% of the total forest area, are mapped wetlands, which indicates that these are rare and important areas. The draft EIS suggests on pages 3-139 and 3-165 for example, that the Forest Plan direction protects wetlands and vernal pools. However, the Plan does not offer specific directions or Forest-wide standards and guidelines that achieve the goals identified in the Plan or would offer actual protection to these particular resources. The draft EIS identified that ground disturbance and canopy altering activities are great threats to wetlands and vernal pools. Such threats would suggest that, for these areas, specific guidelines and direction would be necessary. We recommend that the Forest Plan and the final EIS offer specific standards and guidelines for riparian areas, vernal pools, wetlands, along with any other rare and outstanding ecological areas that have not yet been identified as such.

In a related matter, the draft EIS states that the perched white oak swamp is a rare and very important ecological area. Three such areas are found in the forest and the draft EIS discusses that these areas are threatened by both reproductive isolation and timber harvesting. We appreciate that the Forest Plan and draft EIS identify one area, the Blueberry Patch swamp, as an Ecological Special Area (ESA), providing specific management direction and protection from timber harvesting. However, EPA is concerned that the other two perched white oak swamp areas in the FLNF are not similarly proposed for designation or even identified. Given that the threat from timber management is the more likely of the two threats that the Forest Service can control, we recommend that these areas be designated as containing at least Regional Forester Sensitive Species, if not full ESA protection, and should be protected from timber harvesting. If these two other areas were designated and the Forest Plan proposed specific standards and guidelines for their protection or even enhancement, then we believe that the additional threat of reproductive isolation would be also minimized. National Forests are considered core areas for the maintenance of biological diversity. With that in mind, FLNF should be considered as such an area within the broader spectrum of state forests, national and state wildlife refuges, and state parks, to further the viability of natural areas and the species that depend on them.

We are also concerned with the impacts to wetlands from grazing. The draft EIS states that fewer FLNF wetlands are found in open areas such as in the North Eastern part of the Forest, which contains the grazing for livestock management area; however, these wetlands tend to be larger and more connected. According to the draft EIS, a number of the wetlands are near or within drainages for streams. The draft EIS offers that riparian areas and ponds will be fenced for their protection from livestock. However, the draft EIS specifically refers to streams, stream crossings, and ponds being protected from livestock impacts, and does not mention naturally occurring wetlands and other waters of the U.S. Grazing can significantly impact wetlands through changes in hydrology and loss of vegetation. Therefore, we are concerned that the draft EIS does not specifically state that livestock will be similarly restricted from wetland resources. We believe that livestock grazing measures should be considered that would offer alternatives to grazing in soft bottomed wetlands and waters of the U.S. or that those wetlands occurring close to streams and livestock watering areas be fenced as well. We recommend that the final EIS address this suggestion and offer further protections to wetland resources.

This raises an additional concern with the recognition of the importance of the connectivity of wetlands, riparian areas, and other important ecological areas. Though the combined draft EIS and Forest Plan outline management directions for some of these areas, the documents do not discuss the impacts to the lands outside of these areas and the indirect effects. For example, if timber harvesting were to occur upstream or adjacent to a wetland area or a water dependent

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ESA, that activity could impact the hydrology and function of the larger riparian corridor and the overall wetland complex. While the designate area is not directly impacted, its viability can be compromised by the loss of the important functions of the areas around it. Maintaining connectivity through hydrology, species diversity, and habitat types, and minimizing impacts to these surrounding areas as well, is critical to the overall success of the various research natural areas (RNAs), candidate RNAs and ESAs, as well as those important but undesignated areas such as wetlands and other waters of the U.S. We recommend that the final EIS provide a discussion of the areas surrounding the designated special resource areas as well as other important areas to identify and recognize the contributions those areas provide to the viability and success of the desired outcome for the forest as a whole.

Additionally, the draft EIS was lacking a map that would indicate the location of the Forest's wetlands. Such a map would be very useful in understanding what wetlands were located in the various sections of the FLNF and perhaps enabled us to provide more specific comments. Also, the draft EIS did not indicate if the results obtained from monitoring the streams suggest that the current timbering area buffer strip widths (50-110 ft) are adequate, or if they should be modified. We recommend that the final EIS provide this information and offer a more detailed discussion of the location of the wetlands.

Given these comments, we have rated the preferred alternative 3 as Environmental Concerns - Insufficient Information (EC-2). However, if the Forest Service implements the additional resource protection modifications to alternative 3, we would be pleased to fully support the Forest Plan and final EIS. Please see the enclosed Rating Factors for a description of EPA's rating system.

We appreciate the opportunity to review this draft EIS. When the final EIS is released for public review, please send two copies to the address above. If you have any questions, please contact me at 212-637-3504 or David J. Carlson, of my staff, at 212-637-3502 or at carlson.david@epa.gov.

Sincerely yours,

Grace Musumeci for

John Filippelli, Chief
Strategic Planning and Multi-Media Programs Branch

Enclosure:
Summary of EPA Rating Definitions

cc: R. Moore, Regional Forester

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION

Environmental Impact of the Action

LO-Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC-Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO-Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU-Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of environmental quality, public health or welfare. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommend for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1-Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2-Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3-Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From: EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

FL-585

Schuyler County
ENVIRONMENTAL MANAGEMENT COUNCIL
301 Broadway
Montour Falls, NY 14865

August 4, 2005

Melissa Reichert, Forest Planner
Green Mountain & Finger Lakes National Forests
231 North Main Street
Rutland, VT 05701

Dear Ms. Reichert;

After careful and thoughtful review of the Proposed Finger Lakes National Forest Land and Resource Management Plan, as well as the Draft Environmental Impact Statement, and after various members attended one or more public meetings addressing the proposed plan, we reached a consensus favoring Alternative #2, rather than Alternative #3. The considerations prompting this choice are detailed below.

First, however, we wish to commend the planners and all other parties involved in the process of evolving these proposals for their efforts to encompass the concerns of many individuals and groups, to include a wide diversity of habitats, and accommodate for a variety of educational, recreational, research and economic utilization in both Alternatives #2 and #3. This commitment to consider and incorporate input from multiple interest groups is greatly appreciated.

The chief impetus for preferring Alternative #2, rather than #3, is economic sustainability. Implementation and maintenance of Alternative #3 is far more demanding of both human and financial resources. Given the uncertainty and probable increasing limitations of future financial support, the ability to effectively implement a detailed, multifaceted and labor intensive management plan such as Alternative #3 will diminish as federal funding continues to shrink. In contrast, Alternative #2, being more readily maintained, in part by natural processes, at significantly less cost, provides for long-term sustainability of purpose, as well as less need for dramatic future revisions.

We find that both Alternatives #2 and #3 address the need for open space, but Alternative #2's geographic allocation of management areas renders it less susceptible to future privatization, thus this open space is more likely to endure in perpetuity. In addition, the presence of areas of old growth forest throughout the length of the Finger Lakes National Forest creates the possibility for developing green belts connecting to the Texas Hollow Preserve and the Catherine Valley Trail Complex. And, though not mentioned in the proposed plan, the presence of these old growth areas will reaffirm one of the original rationales for creating this national forest, namely, watershed protection.

In our opinion, Alternative #2 results in far less impact on the forest. Timber harvesting, already nearly halved from 132 acres in Alternative #1 to 80 acres in Alternative #3, is reduced to 35 acres, a fourth of the current value, in Alternative #2. Given the negative financial outcome of timber harvest on federal lands due to cost-intensive compliance and oversight issues, Alternative #2 actually represents a cost savings in terms of manpower hours. Coupled with lessened timber harvest, Alternative #2's maintenance of large tracts of semi-primitive acreage limits access by motorized vehicles such as ATVs and snowmobiles, thus addressing local citizens' desire to preserve the forest and its trails for specific recreational activities such as skiing, hiking, snow shoeing, etc. Local residents reap an immediate non-economic benefit, while the local counties and municipalities gain a potential lure for eco-tourists.

In conclusion, though realizing the Forest Service's preference for Alternative #3, as an oversight group charged with advising the Schuyler County Legislature on matters affecting the local environment, we strongly endorse Alternative #2 as the best long-term solution to create and preserve the Finger Lakes National Forest as a viable and sustainable asset, both economic and other, for the local community. Our thanks for your attention to and consideration of these comments.

Respectfully,

Kate Bartholomew, Chair
for the Schuyler County EMC

CC: Thomas Gifford, Chairman, Schuyler County Legislature